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December

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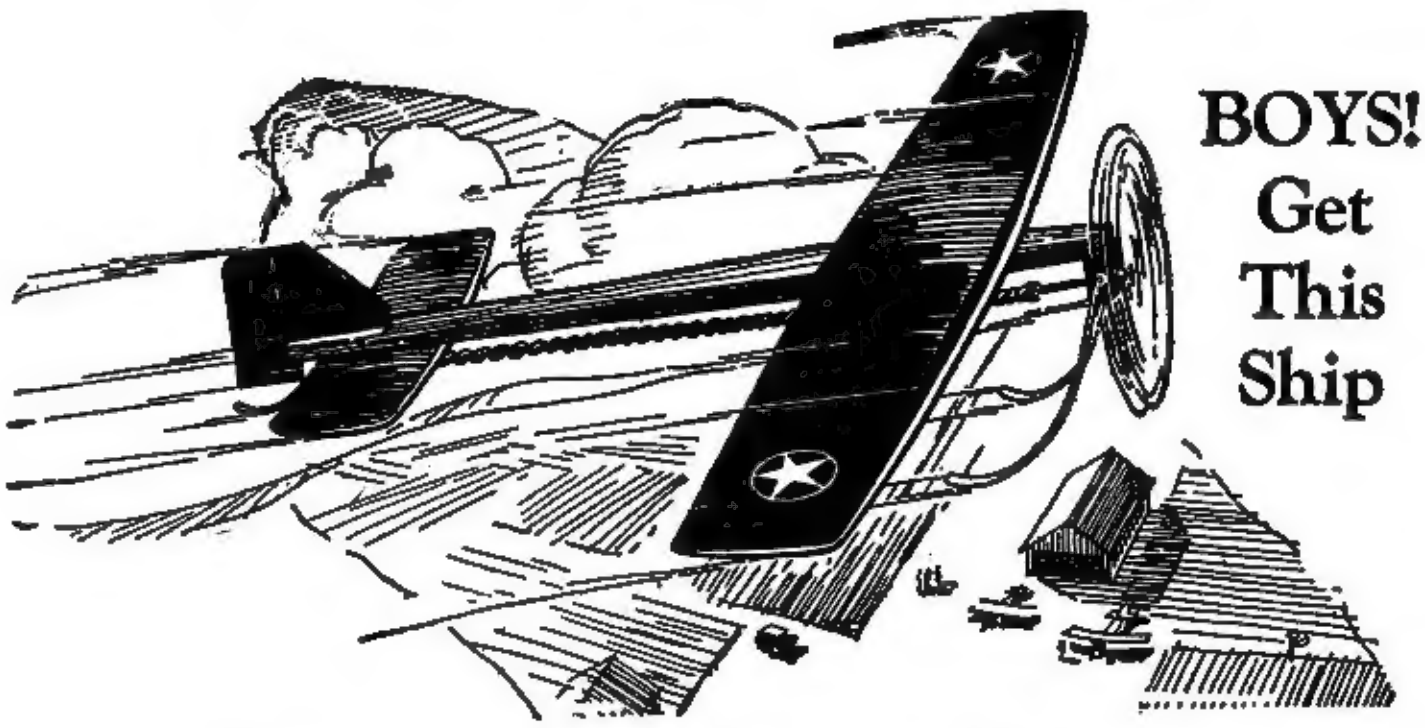

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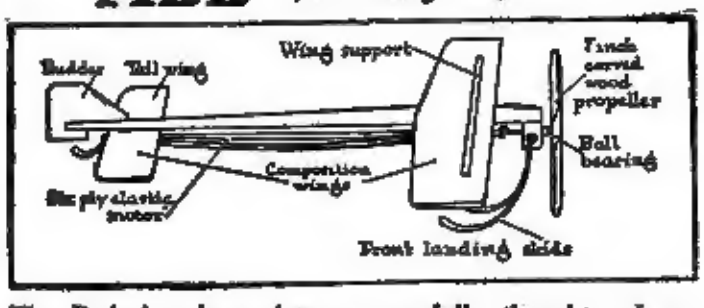

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Vol. 1, No. 7

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DECEMBER, 1929

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ON THE COVER

this month is illustrated "The Time Oscillator," by Henry F. Kirkham. Here you see our intrepid explorers into the past sitting on top of their invisible time abode. They wear electrically-charged copper mesh clothing for protection. One of the explorers is just about to engage in conversation by means of a megaphone with the soldiers of the long-vanished race of Atlantis.

NEXT MONTH

THE FITZGERALD CONTRACTION, by Dr. Miles J. Breuer. After the editor read this little interplanetarian masterpiece by the well-known science fiction author, he felt imbued with so much enthusiasm that he wrote to the author as follows: "Congratulations! This is really a marvelous story. We shall be delighted to use it in in the forthcoming issue of the magazine. May we compliment you in saying that you have quite outdone yourself in the present story, which, in our opinion, is by far the best thing you have ever done. This is the kind of material that our readers are looking for. They are all particularly interested in interplanetarian material." Can we say more! It is an interplanetary story PLUS! Do not miss it!

THE RED DIMENSION, by Ed Earl Repp. Our versatile author takes us now for an excursion into the sixth dimension. The story, as usual, bristles with excitement and adventure. There is not a line that does not hold your intense interest. The only fault we find with the story was that it was far too short.

THE VAPOR INTELLIGENCE, by Jack Barnette. Here is a remarkable interplanetarian story of a different type. It has all the beautiful weirdness of "The Moon Pool," yet the science as well as the inherent literature is excellent all the way through. A story you will keep to reread time and again.

THE CONQUERORS, by Dr. David H. Keller. If you have enjoyed the first part of this unique story—as we know you have—you will be thrilled by the concluding instalment. As is usual with him, Dr. Keller rises to uncharted heights with his masterful vision and he has given us again an unusually good insight into the future of the human race and the problems it must meet and face. There is a thrill all the way through.

PRIZE CONTEST LETTERS—The winning letters of the fundamental error contest will be published. We have received all told 2,600 letters explaining the fundamental error in the story "Into the Subconscious," which appeared in the October issue. Do not miss reading these thrilling and stimulating letters.

AND OTHERS.

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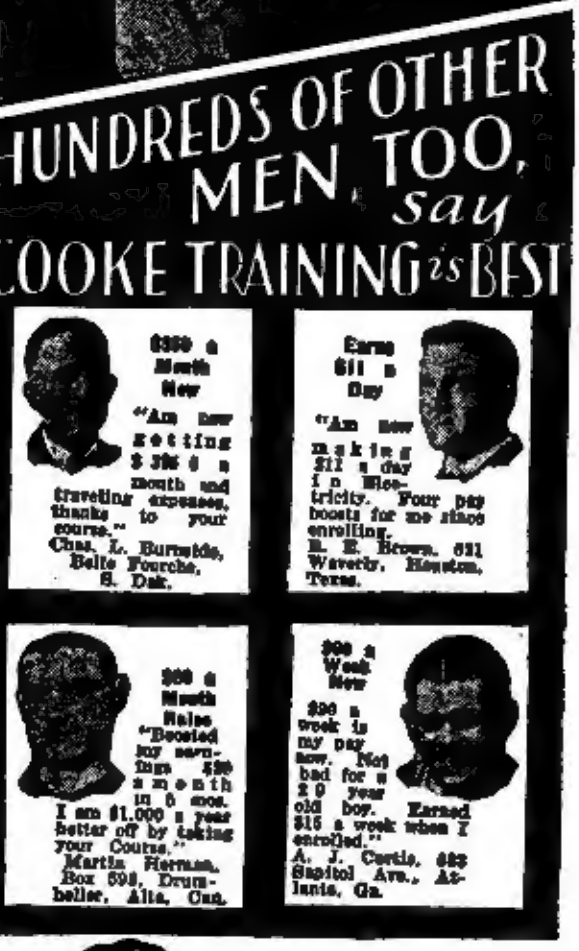
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VOLUME 1
No. 7

Science WONDER Stories

DECEMBER
1929

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These nationally-known educators pass upon the scientific principles of all stories.

THE WONDERS OF INTERSTELLAR FLIGHT

By HUGO GERNSBACK

AS late as five years ago the idea of interstellar flight was taken seriously by few scientists of repute. It was usually referred to as an interesting subject for speculation, but totally impractical and visionary science fiction.

During the past few years, however, possibilities of the idea have been seized upon by the more imaginative scientists; particularly by a small group of Germans, who have not only worked out the problem in a thoroughly scientific manner, but have also been able to induce capitalists to finance their experiments.

The pioneer of rocket flying is, of course, the American, Professor R. H. Goddard, whose experiments on rocket flying have been sponsored by the Smithsonian Institution of Washington. Professor Goddard, however, has always maintained that his experiments were conducted mostly for the technical advancement of the rocket principle, and that the Smithsonian Institution is at the present time not interested in rocket flying outside of our own planet.

While the obstacles connected with interstellar flying are, of course, tremendous, they are no longer considered insurmountable by the scientific world.

The first space flyer, however, that reaches our nearest interstellar neighbor, the moon, will, no doubt, arrive there without any living thing aboard. And, until a successful interstellar flight can be made without human occupants, no regular flight with human beings will be undertaken. That, however, can be overcome. It should be possible to build an interstellar flyer which, upon alighting, will automatically set up a huge magnesium flare upon the unilluminated part of the moon. This flare would be visible to our astronomers and would be sufficient evidence that the trip had been completed successfully.

It is quite possible that more than one flight of such an unoccupied machine will have to be made before a journey with human occupants is attempted. A half dozen, or even a hundred, missiles may have to be sent to the moon, in order to demonstrate to the satisfaction of our hard-boiled scientists that the time is ripe to navigate outer space with passengers.

After this successful demonstration, many other obstacles will still have to be overcome. We know practically nothing of outer space, and there may or may not be existing conditions that would prove fatal to human beings.

The obstacle of interstellar cold, which is close to absolute zero, may be discounted today as comparatively unimportant. A machine can be built that will receive enough heat from the sun to keep a double-walled space-flyer tolerably comfortable.

The question of oxygen, which must, of course, be taken along in the space flyer, no longer presents a technical difficulty. Carbonic acid gas can be removed by chemical means, and no trouble need be felt on this score. The same is true in the case of the food supply, which can be taken on a flyer in adequate quantities, and need not cause any undue worry.

There remains the obstacle of living inside a space-flyer where all sense of gravity has been removed. A flyer in space, travelling even to the moon, will reach an area where its contents appear to weigh nothing, or nearly nothing. And, while we may calculate the effect of such a condition, we are not altogether certain how the human anatomy will bear up under it. Means have already been suggested to overcome this obstacle; as, for instance, Captain Noordung's, who manufactures his own "gravitation" inside a space flyer by means of centrifugal force. While theoretically feasible, it may be impracticable, because of the increased weight required by such a mechanism. Absence of gravitation really means a "free fall;" the same condition as that felt the first instant by a man jumping from a building will be experienced inside of a space flyer. This sensation may cause physiological disorders.

The next important obstacle is that of the little-known cosmic rays. It is not known whether they become formidable inside of a space flyer, once it is removed from the earth's atmosphere. It may be possible to find some sort of an insulation to ward off, or reflect, these rays if they prove to be harmful.

But the most dangerous of all obstacles, undoubtedly, are meteorites and other small bodies gravitating freely around the earth and around the moon. It is possible that they can be avoided—that if more is known of the movements of these small bodies it may be possible to choose a time for a flight when they are not so numerous. If the number of the meteorites, on the other hand, remains constant all around the earth and moon, we may well despair of seeing space flying.

The reason is simple. We may disregard a large meteorite, the size of a house; because such a large body could, perhaps, be seen by telescopic vision from inside a space flyer, and then sidestepped. But small bodies the size of even a nut or a cherry are just as dangerous, if not more so. These objects travel usually at a rate of about seven miles a second upward, and at such speeds are far more dangerous and far more penetrating than the best cannon ball. At such speeds, even a small meteorite, the size of a large walnut or even of a pill, would have no difficulty in passing clear through the strongest armor of a space flyer. Even smaller ones, the size of a pinhead, would still be effective enough to pierce the thickest plate glass of the space flyer's porthole windows.

So far, science has given us no clue as to overcoming this, the most formidable danger; and until a satisfactory answer is forthcoming, actual space flying may not come about.

The Conquerors

by David H. Keller M. D.

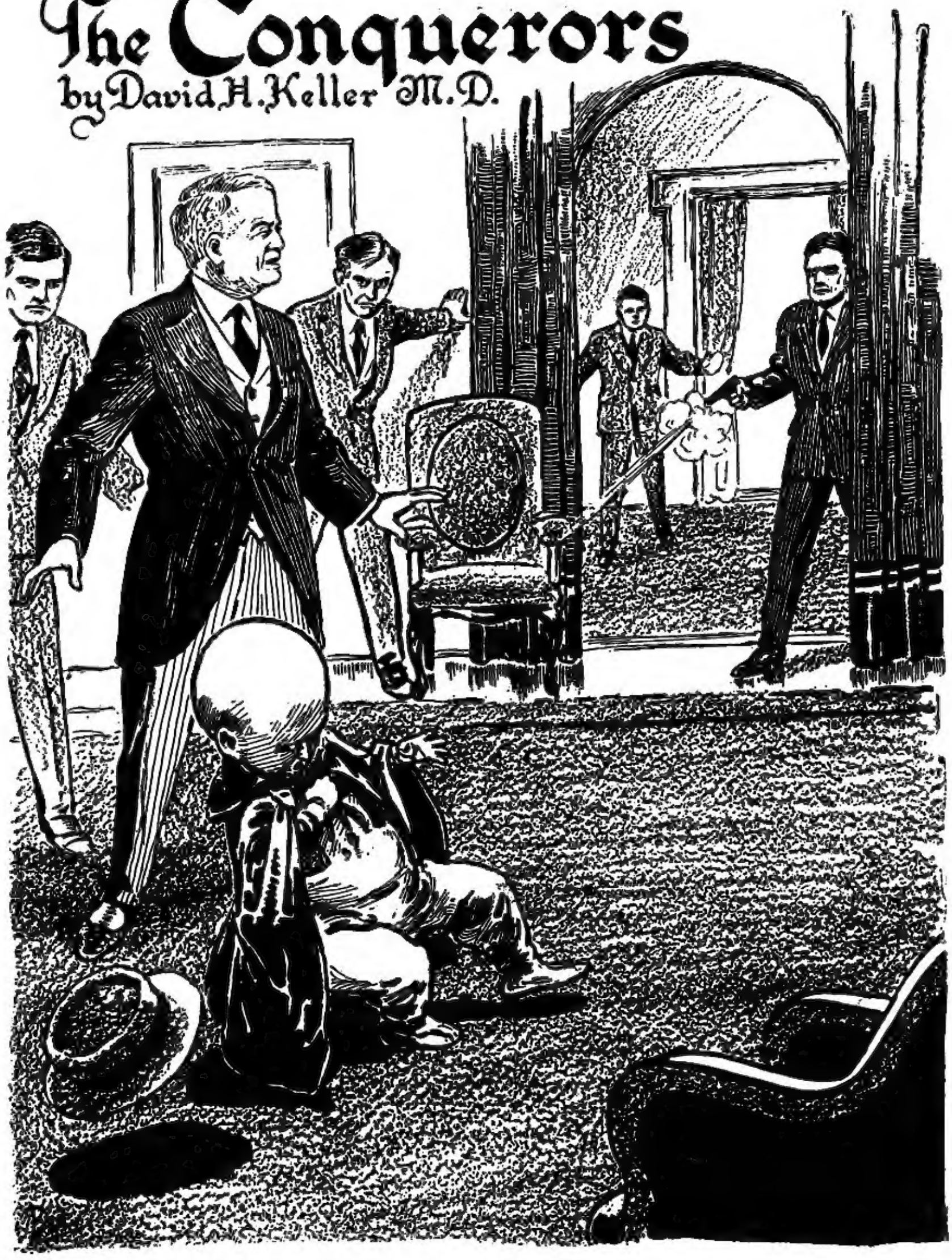

Illustration by Paul.

The President stepped toward him. As he did the "ambassador" raised his right hand in what seemed to be a menacing gesture. A shot rang out and the little fellow dropped to the floor.

THE CONQUERORS

By the author of "The Human Termites," "The Boneless Horror," "The Feminine Metamorp hosis," etc.

"I SUPPOSE you noticed, Mallory, that the radio is out of commission?" said John Ormond to Mallory Wright, who nodded. The men, both bachelors, had become acquainted shortly after their arrival in New York; and the five years which they had spent in the metropolis had been made far more pleasant by this friendship. Mallory was an amateur of the sciences; while John, though in reality a clerk in a broker's office, dreamed of the time when he could become a hunter of large game.

DAVID H. KELLER, M. D.

It was a peculiar friendship, depending, as so often is the case, on a complete dissimilarity of tastes. Mallory Wright delighted in science; there was nothing in its many fields of which he did not know at least a little. Born in Philadelphia, raised and educated in the cities of the East, he had never knowingly killed anything, except a few flies; and even then he was better pleased to chase them to an open window than to squash them with a swatter. John Ormond, however, who had been raised in the country, enjoyed nothing so much as hunting or fishing. Deprived of much of this sport by his life in New York, he had substituted for the reality a dream life of adventure, obtained from literature. He had gradually collected a rather complete assortment of rifles, and spent both time and money in target shooting. Thus, he felt that he was prepared for any stroke of luck that might place big-game shooting in his way in the future. But, beyond the mechanism of a rifle, he knew nothing of machinery; and the mysteries of science lay beyond a closed door that he never tried to open.

Wright had persuaded his sport-loving friend to install a radio and, after a long period of tuition, had taught him to operate it. After having had it in his one-room apartment for three years the most that Ormond could say was that, sometimes, he could get the stations he wanted, and, sometimes, he could not. This particular evening, the sixteenth of March, 1933, was one of the times when not even a sputter emanated from the reproducer. Ormond, when his friend had made himself comfortable went back to the radio question. "Do you think it is out of order again?" he asked.

The scientist smiled rather dolefully as he replied: "It all depends on what you mean. Mine, too, is not working tonight, and, so far as I have been able to learn, neither is any receiving set in the city. Perhaps the trouble extends further than that. Anyway, there is an extra edition of the *Evening Sun*, featuring the fact that the city's radio service is dead."

"What is the trouble? I thought your set was fool-proof."

"It is," Wright replied: "Of course I have not had time to examine it carefully; but all the connections and tubes seem to be in perfect condition. I telephoned to Hopkins; you know that long-haired chap who taught me all I know about radio? He has a super-regenerative set that would make an old maid leave home. He says the same thing; his set is dead, yet he cannot find out what is wrong with it. He had phoned to several of his friends and they areallin the same fix. Of course, the newspapers have found out about it, and they consider it news. No doubt it will be in all the mornnig papers; but the *Evening Sun* was the only one to get it in a night edition."

"That pleases me," John finally gasped: "It's no news if a dog bites a man, but if a man bites a dog, that is different. I suppose, when there are two million radios going all the time in this city that is not considered news; though the papers print the daily programmes. But to have something happen, so that those two million radios are silent, makes everybody excited and the papers print special editions telling all about it."

"It really is a serious matter," said Mallory Wright, gravely: "The city dweller has become dependent on his radio for his amusement and also for his education. There are thousands who have no other means of educating themselves than the radio lectures they hear. Other thousands listen to sermons and sacred concerts. Children are put to sleep at bedtime by stories and

WHEN projecting our thoughts into the future, we should always be mindful of the past. A few hundred, or even a few thousand years, in the development of humanity means practically nothing; because anthropologists are agreed upon the fact that all evolution in the advanced animal types is slow and tedious, and that many thousand years are necessary to make a real difference in the bodily structure of the animal.

But taking a big leap, whether forward or backward, will introduce us to conditions entirely different. Fifty thousand years ago humanity was still in the cycle of the caveman. —a low intelligence with a bodily structure very similar to that of modern man, yet with many obvious differences.

What will man be like fifty thousand years hence?

Dr. Keller in the present story has written a novel and epoch-making answer to this question.

"The Conquerors," like "The Human Termites," is bound to become a science-fiction classic. As usual, Dr. Keller gives you not only a tremendous amount of food for thought, but also surprises and adventure galore.

lullabies over the radio. The business man gets his market reports, the sea-captain and air-pilot are given the weather forecasts. For long hours every day the ether is throbbing with news, and that news is listened to and appreciated by millions. Now 'the air is dead.' Perhaps that is a wrong way to put it; but that is the idea that seemed to be in Hopkins' mind. There is nothing wrong at the transmitting stations and, so far as we have been able to determine, nothing wrong with the receiving sets. A thousand experts cannot be mistaken. So the trouble must be in the air.

"Of course, we have had trouble with the 'air' ever since radio was first thought of. Static and 'fading' and interference from machinery all the time. And the 'air' itself distorts and absorbs some of the waves. Gradually the experts have been growing accustomed to the difficulties and learning to combat them. But this affair today is different; this is not a matter of static or fading for a few seconds. For some reason the air is 'dead' as though it had refused to transmit the waves."

"Good! Then we will have peace in this apartment house till the trouble is discovered."

"It looks that way. But I do not believe it will be for a very long time. Right at this minute, while you are wasting your time fooling with a gun that will never come within five thousand miles of an elephant, the greatest scientists of the country are working on the problem. Perhaps by tomorrow a solution will be reached. But it certainly is a peculiar situation."

The Code Message

WRIGHT went over to the radio and carefully examined it; Ormond went on polishing the rifle. From the neighboring Cathedral chimes announced eight o'clock, the hour of the evening service. And, as the great bells ceased and the last echo died away, the radio's reproducer started to emit sounds. Wright moved rapidly to secure the proper amplification and, as the sounds came over more clearly, he frowned deeply; then started to take down the message. For, instead of music, or a voice, a message was coming in the International Morse Code of dots and dashes. Ormond looked annoyed; he had looked forward to a quiet night and the renewal of broadcasting simply ensured that, in a short time, a hundred radios in the apartment building would again be blaring out a score of different programmes.

At last, the code message came to an end; work as he could, Wright was unable to revive the receiver. Once again it was "dead." He walked slowly over to the center table and sat down with his notebook under the lamp. For long minutes he sat there and, then, taking his fountain pen and a piece of paper, he started to transcribe the message. Ormond went on fondling his new pet, the rifle.

At last Wright rose and, as though to shake off something, he strode over to the phone and called a number. His voice trembled as he spoke:

"Hullo, is that you, Hopkins? Yes! This is Mallory Wright. Did you get that message in code? Yes; I got it, too. Started to come over at exactly eight. Can you understand it? No, neither can I. I have all the words. What do you suppose? Think some one is trying to kid the whole country? Well, no doubt it will be in all the papers tomorrow. Whoever sent it also killed the air for six hours. Think so? Perhaps you are right. The Government will have to find out who he is and how he did it. Radio is doomed if that sort of thing is possible. I am going to spend the night here with my friend Ormond. You have his phone number? If you hear anything new, let me know."

He turned to his friend; there was no doubt of his excitement.

"Hopkins got the same message I did."

"Well, why shouldn't he?" Ormond yawned.

"But you do not understand. Hundreds of radio fans in the city, and, for all we know, in the nation, working on their sets and trying to find out what made them go dead. Then, suddenly, at eight o'clock a message comes over in the International Code. I take it down and it is so peculiar that I think I am a little batty. I call up Hopkins and find he has caught the same message. Perhaps a thousand other radio hams in New York copied it."

Ormond gave the rifle a final loving rub and placed it back on the rack. Then he walked over to the center of the room where Wright was looking at his notes.

"Well, I'll bite," he said jokingly: "You read me the message and I will tell you what I think of it."

"Here it is," said Wright: "Just listen to it!"

> *"'Attention. Attention. This is the broadcast station of The Conquerors speaking. All airplanes are commanded to cease operating over the states of Kentucky, Tennessee, West Virginia, Virginia and North Carolina. All pilots disregarding this order do so at their own risk. Further orders will be given to the nations of the world from time to time; all orders being preceded and followed by a four-hour silence."*

"Now, my opinion of that message is simply this," was the short and forceful reply of Ormond: "That is the work of a nut, or, to use more elegant language, a person who is mentally deranged. I believe they call such a condition insanity. The aviators of this country will pay no more attention to a message of that kind than they would to a command to fly to the moon and bring back a peck of pickled peppers."

"Undoubtedly you are right," agreed Wright: "It sounds like the work of a lunatic. But there is no reason why a person cannot be insane and be powerful at the same time; and whoever is pulling this joke has the ability to kill the air for over four hours, and then restore it just long enough to send this message, and then kill it again. And whoever

is brilliant enough to do that is neither a fool nor hopelessly insane; my personal opinion is that he is in earnest. The only other way to look at it is to consider it as a clever advertising stunt. Suppose tomorrow one of the radio manufacturers comes out with definite proof that his machines were the only ones working during this silence? How about that? Of course, the government would give him the dickens for doing it; but think of the publicity he would have! That may be it——or it may be something far greater, vaster, something that is so unusual and so unique, that we will be unable to work it out for ourselves, and may have to be told the secret of it in words of one syllable."

"Oh, bosh! Nightmares! I get that way at times; dream I am shooting a tiger or thrusting a harpoon into a whale. Forget it, and come with me for a glass of beer and a cheese sandwich."

"I'll come, but I am not going to forget it. Something has happened tonight that I feel is going to change the scientific life of this world."

"Fiddle-faddle! Shake yourself out of it! Let's eat and then go around to that new shooting gallery. You ought to practice more. You are positively the worst shot I ever saw."

"And you are the worst scientist."

So the two friends left the apartment, to spend the rest of the evening together. Wright shot at innumerable clay ducks and missed most of them; while Ormond amused himself with just breaking off their heads. Meanwhile, the telegraph and telephone services of the nation were throbbing with frantic messages; from one side of the continent to the other, all the scientific experts of the Government and the great radio and engineering corporations were conferring with each other. And, at the end of all the conferences, the best that they could do was to admit that what had taken place during the past twelve hours was totally beyond their comprehension.

CHAPTER II

The Air Blockade

THE next morning every newspaper featured the story of the uncanny "killing of the air" and the peculiar message. Practically every large city in the nation had suffered the same interruption of radio service that had been so noticeable in New York City. In every city, radio experts had been interviewed and all prepared lengthy explanatory statements for the papers; when these statements were carefully studied, it was easily seen that no one really understood what it was all about. There seemed to be an unanimous opinion that, in some way, a deranged scientist had obtained control of the "air." But why he should try to stop travel by air over a few southern States, or what he meant in calling himself by such a fantastic name as "The Conquerors," were mysteries that no one was able to solve. The government decided wisely, or otherwise, to ignore the entire affair, so far as any open activity or official comment was concerned; but, under cover, a dozen of the best operatives of the Secret Service were assigned to work on the case.

Human nature, as shown by many legislative experiments, has a very distinct peculiarity. Just as soon as any act is specifically forbidden, at once that act becomes one that millions feel urged to do. This was illustrated on the day following the publication of the message forbidding air travel over the five designated states. At once, aviators who had previously never thought of making an air journey in that portion of the country had become convinced that only by absolutely disregarding the order could they be happy. Plane after plane from every part of the country was tuned up for the special trip. From every state in the union there proceeded a veritable cloud of planes headed toward the forbidden area. And, throughout that area, the air-transport companies simply announced that schedules via the air would be maintained as usual.

Some one had thrown a challenge into the teeth of the finest sportsmen of the nation. The gauntlet was unhesitatingly picked up, and before noon of the next day a thousand aces from outside the forbidden territory were preparing to fly over it. That afternoon, at least five hundred started. The experiment was watched with the greatest interest by the Secret Service operatives; though outwardly the government appeared to take no official action in the matter.

At the end of another twenty-four hours two facts became widely known. Not a single plane which had attempted to rise from the ground in any of the five states had been able to do so; not one motor of an airplane could be even started. And every plane which had started to fly from an outside state had been forced to land as soon as it reached the forbidden borders. In every case, engine trouble of a peculiar and unusual nature caused a forced descent to earth. Fortunately, there had been no fatalities. Every pilot attempting the flight was an expert, and had no particular trouble in reaching the earth with a dead engine. Night came, with a cessation of efforts and the forced acknowledgment that there had been more than an insane or bluffing threat behind the message.

What did it mean?

Was America to be defeated by a single day of adversity? There were countless air pilots who did not know the meaning of the word "defeat" who simply started to overhaul their airplanes and prepare for another flight. This time the attempt was semi-official; for the government, at last conscious of a threatening danger, had asked the two greatest aces in the country to make the Washington-Richmond flight in a government plane. A happy circumstance had placed Colonel Landry and Lieutenant Murphy in Washington together on the day when the challenge had been hurled at the nation. Each of these great flyers had at once prepared to make a trial flight and was about ready to leave the ground, when they received orders postponing their trip. No explanation was given. All that day they

waited anxiously, seeing friend after friend who had been forced down at the Virginia border working in vain to start their engines. When night came, bringing with it the story of uniform failure, they appealed in every way possible to the War Department for permission to start. This authority came early the next day; they were to take a government hydroplane and start from the Potomac basin. Mechanics had been tuning up their plane, and it was placed in perfect running condition. They were advised to attain an altitude of at least ten thousand feet, and then turn and go south over Virginia. If they were able to reach Richmond, they were to return at once to Washington.

This was the supreme test. A hydroplane running as perfectly as mechanical skill could tune it, with two of the greatest pilots that the country had ever developed. A start on the river and no effort made to cross to Virginia till a height of ten thousand feet was reached. Surely there was a promise of success, a vision of restoring to the nation its sanity. Achievement would mean that the previous failures had simply been the result of inadequate preparation. Failure would mean—but Landry and Murphy had never failed.

The start was perfect. The great mechanical sea gull rose majestically in the air and became smaller and smaller as it circled higher and higher over Washington, its white wings glittering in the sunlight. Then when it was almost a speck of dust it started south on its defiant flight. The end came all too soon. Those on the ground who were watching through high-powered glasses, and the others who had sensitive detectors listening for the sound of the motors, must have blanched when the sea gull faltered and volplaned down, seeking safety on the open body of water.

"We have nothing to say," was the terse statement of Landry, as he stepped ashore. The two aviators took a government car and started back to the capital, evidently deeming their report was too valuable to trust to any other messenger than themselves. The machine was driven without mercy. Soon they were in conference with the Secretary of War, the head of the Air Service, and several of the scientific leaders in the progress of American aviation.

The newspapers would have gained but little satisfaction had their representatives been present at this conference. Colonel Landry, as spokesman for the two aces, made a short and pithy report.

"We had no trouble in leaving the water," he said: "The old boat acted just as fine as anyone could expect. We followed orders to the letter. When we were up seven thousand feet and going north, we thought we could safely turn around; and, by the time we had made the curve and were well on our way back, we were better than nine thousand feet. The engine was going perfectly in every way. We watched the Potomac below; and, a few seconds after we passed over it to the Virginia border, the engine stopped. We were prepared for it; though of course we were in hopes that it would not happen. We started to glide down through the air and by careful handling made the river again. I have no idea what happened, but I do know that it never happened to me before. Not that way; and if I could get the man who did it, I would like to wring his neck for him."

"Have either of you any idea as to possible methods of investigation?" asked the Secretary of War.

The two aces looked at each other.

They were expert air pilots. In the sky they were supremely confident of their own ability; but they were not real scientists, nor did they have the instinct necessary for the making of detectives. They simply answered that some one was playing hell with American aviation and, the sooner the government found out who it was, the sooner they could put a stop to it.

A New Threat

THE next day at four p. m., Eastern Standard time, radio communication ceased throughout the United States. Other nations, such as Mexico and Canada, were also affected. European countries could receive waves originating within their own boundaries but could neither send radio signals to North America nor receive from that part of the world.

American scientists, remembering the first message which had stated that the second would be preceded by a four-hour silence, knew that in all probability the message from the radio crank would be broadcast at eight that night. Every radio operator in the country was preparing to receive it. Government officials had enlisted the aid of the scientific laboratories of the nation and an effort was made to determine, if possible, the exact origin of the message. Under ordinary circumstances, even with the air full of waves of all lengths and going in all directions, this is possible; and that night at eight o'clock there would be but one message, but one wavelength, and after the message was over there would again be silence. Something surely ought to be accomplished.

The message came, promptly at eight, and this time the minds of the greatest men of America were focused on it. The President and his cabinet had gathered together. In Cambridge, Schenectady, New York, Pittsburgh and Washington, men who had become famous in the world of electrical research gathered to help each other to the instant solution of any problem that might arise. Then the message came, again in International Code.

A radio expert took it down as it came, and read it to the President and his official advisors:

> *"Attention. Attention. This is the broadcast station of The Conquerors speaking. Our former order in regard to airplanes has been disregarded. If this continues, we will be forced to kill all pilots trying to use the restricted territory, and also suspend all use of electric power in these states."*

The President of the United States and his cabinet listened quietly as this message was read to them; as the radio expert ceased speaking, a hush,

a stillness as of death, fell over the group of men assembled around the table in the executive office. At last the President said:

"Gentlemen, it seems that the nation is faced with an unknown danger from an unseen enemy. We have first been prohibited the free use of the air over five of our states. Our effort to defy this order has resulted in the threat of death to any of our pilots, and a most peculiar statement that all use of power may be prevented in these five states. Irrespective of the source of these messages, it appears that we must act to preserve our dignity and to help this great portion of our nation in its trouble. If we were sure that these messages were coming from one person, our course of conduct would be different from that necessary if there is even a possibility that we have to combat the intelligence of a group. I think that we ought to communicate with the governors of these five states and assure them that the entire resources of the nation are at their command.

"Then we should at once offer a reward for apprehension of this person or persons, or information that will make it possible. I believe that reward should be adequate, large enough to assure the interest of every person in the entire nation; I think that it should be at least a million dollars. If you have no objection, I will request the five governors to issue a joint proclamation, offering such a reward and, if the time comes when it is claimed, we will ask that it be repaid by congressional appropriation. In the meantime, the Secretaries of the Army and Navy will be ready to place their forces, as needed, at the control of these governors. Perhaps it may be well to mobilize all available units of the Marine Corps; they may be able to handle any emergency that arises."

At this point the conversation was interrupted by an urgent message for the Secretary of War. He read it with interest, and then asked for the attention of the cabinet.

"This is serious news, gentlemen," he said: "It seems that Colonel Landry and Lieutenant Murphy returned at once to Newport News after they made their verbal report to me, and had their seaplane overhauled. Immediately after this second message came from these cranks, who called themselves 'The Conquerors', they went to the hydroplane and started out over the ocean, determined to prove to the world they were not afraid of the threat of an insane criminal. When they turned back and were well over the land, their gas tanks exploded and they dropped to their death in a sheet of flame. This message informing me of the deaths was telephoned by the commanding officer at Newport News. It seems as though the threat was more than an idle boast."

"It may have been a mere coincidence," commented the Secretary of the Interior.

"I hardly think so," said the President: "I think that these are only the first of our casualties. We are at war, but with whom, or why, I cannot tell. I will get in touch at once with the five governors and have the proclamation issued tomorrow. One million dollars ought to produce some information that will clear up this situation."

The cabinet adjourned, leaving the President, his secretaries and several clerks still busy. He sent and received a hundred telegrams; for over an hour he talked over the telephone with the five governors. At three in the morning he felt that he had done all that he could that night, and went to bed, utterly wearied but so worried that it proved impossible for him to sleep. Open warfare with a foreign nation would have been simple to handle, compared with this.

The next day seven aviators died, trying to fly over the forbidden territory. But this was not the greatest calamity to strike the five states; for every piece of machinery operated by, or dependent for its power on electricity, had ceased to operate. The blow came at six in the morning and left thousands of automobiles stalled, made hundreds of manufacturing plants idle. Not only radio, but the telephone, telegraph, automobiles, the electrical servants in the homes—all had become suddenly useless. There was a great deal of confusion but little congestion, even in the large cities. There still remained steam power, and in the mountain regions water power; but, wherever the steam or the water was used in the endeavor to generate electricity, it was uselessly operated.

Solutions

UP to this time, the masses in the United States and even in the five states so drastically affected, had looked upon the messages and the show of potential power as simply a peculiar unusual form of a joke. Aviation, though making tremendous strides, was still looked on as being in the experimental stage of its progress. The public was accustomed to planes failing to function, and even rather blasé in regard to air deaths. But, when the automobile owners of five states suddenly found at six in the morning that they could not drive their cars, when millions of people were unable to use the telephone, telegraph, or electric light, when practically no manufacturing plant in five states could start up because its electrically-driven machinery would not operate—then the "joke" was no longer pleasant.

There was annoyance and confusion, but no panic. People ate their bread without its being toasted, walked to their offices and up the long-unused stairs to their rooms. Working men reported for duty and were told to come back the next day. The morning papers, printed around midnight, had come out as usual. It was apparent that, unless some change took place, the afternoon papers could not be issued. The joint proclamation, offering one million dollars reward for the arrest, or information leading to the arrest of the criminals, was printed in Washington and rushed by train to the five states for distribution; it was printed in every newspaper throughout the nation.

Within twenty-four hours, five thousand communications had been received by the several gov-

ernors, explaining exactly what had taken place and who were responsible for it. Exactly one hundred per cent of these letters were written by cranks, of either the religious or political variety. Every possible society was blamed for the unusual condition. Not a man who had a bitter enemy but wrote, suggesting that this enemy was at the bottom of the whole affair, and requesting that the million dollars should be sent at once to the writer. Subsequent developments showed that the offer of a million dollars reward had only added to the work and worry of the governors, and had not helped in any way to the final solution of the mystery.

Meanwhile, in New York, Mallory Wright and John Ormond spent the larger part of their spare time talking over the affairs of the nation. They were both interested in the idea of a million dollars as the reward for clever detective work.

"I could go elephant hunting on much less!" exclaimed Ormond: "We would go together. You could study the reason why there is so much fever or lightning or so many bugs in Africa, or anything else your scientific mind requires for its amusement; and I will see that any wild animal who tries to eat you is promptly killed. It will be a wonderful experience for both of us, and all we have to do to make the dream come true is to find this guy who is raising so much trouble down South and turn him over to the Government."

"That is all," replied Wright, seriously: "But how shall we go about it?"

"That is easy. Everybody else has failed because he has thought of the average ordinary things of life in connection with radio, or the automobile or airplane. Now, with me, it is different. I am not a scientist; all I am supposed to do is to point a gun accurately and, at the right fraction of a second, pull the trigger and get my game. So, I do not have to look at this is a scientific manner.

"For example, I can say that the Chinese know they can never conquer us by coming over the sea; so, they have bored a tunnel through the earth and need these five states to place their camps on. Does that entitle me to the million? Here is another: the bootleggers are tired of being interfered with. If they can scare those good people down there so that they will all move west or north, then all of these five states can be used for the production of whiskey. They have gone into a combine with the sellers of gasoline and have diluted every gallon of gas with a pint of moonshine. Naturally, the cars get drunk and refuse to go. How is that for an idea? Does that bring us any nearer the million? I can think up solutions like that as fast as I can talk, but there is just one thing wrong with them."

"And what is that?" asked Mallory Wright, somewhat wearily.

"The trouble is that they are not the right solutions."

The nation waited anxiously for something new to happen. It seemed impossible that this second message should be the last. There had been no resumption of electrical power in the five states. Manufacturing interests were working twenty-four hours a day in the endeavor to make use of steam in some way. Horses, mules and bicycles were pressed into service to replace the useless automobiles. A few country papers were being printed by hand. The city papers had been forced to suspend regular operation; they continued giving such news as they could obtain to the public through their bulletin board, and small handbills. All messages had to be carried by hand except those sent by steam railroads. The farmers felt the change the least; while the urbanites had the greatest difficulty in adjusting themselves to the new life.

People met each other on the street, and, instead of the usual question concerning their health, asked, "When is it going to end?" Occasionally one deep thinker would ask:

"What will the end be?"

The President of the United States felt the entire situation keenly. He realized that the citizens of the five restricted states were suffering, while those in the rest of the states were being only occasionally annoyed by interruption of their radio service. He had thought that the reward of a million dollars would bring almost immediate results. As the days passed without any evidence of the successful solution of the mystery, he became more and more disturbed. Radio direction-finders in various stations, operated at once as soon as the last threat was delivered, had proved valueless. When the lines from the stations were drawn, showing the directions from which the broadcast emanated, and these were placed on a single map there resulted so many intersections, and these placed all over the country, that their results were deemed valueless. The radio experts agreed that the same powers that had suspended radio service had also "scrambled" the air, making their finders useless.

Troops were in readiness at every strategic point; but what use were marines or soldiers where there was no visible enemy to fight? There was only one thing to do and that was to wait; and waiting under such circumstances was hard, even for a man with the greatest patience.

For over a week no aviator had crashed; for the simple reason that none had tried to fly over the threatened territory. For eight days business in the five states had been at a standstill. During each of these eight days the President had tried every possible avenue that would show even a chance of successfully solving the puzzle. And at the end of the week and one day, all that he could say was that he was still working.

On the eighth evening, the private secretary was called to the phone; it seemed that the person at the other end wanted to see the President that evening at midnight. The secretary explained in dignified but cold language that such an appointment was impossible; he was told that it must be made possible. The secretary hung up the receiver. In three minutes he was again called to the phone; this time his language was less formal and decidedly warmer. The third time he swore. The President,

who was passing into the secretary's office at the moment, asked what was the matter and the secretary related what had happened.

"Allow me to answer him if he calls again," ordered the President: "I don't like to be brusque in turning down a man who is as insistent as that; he may be able to tell me something of importance to the nation. I will stay here for a little while; so that if he rings again, I can do the talking.

The telephone rang again; it was the same voice. The speaker wished to see the President at midnight; he had selected that time because he thought that it would be most inconspicuous, and it happened that his business was of a very confidential nature. Who was he? That would be brought out later on, but for the present enough to say that he was an ambassador. Of what country? He would tell that later also. Could he come? Good! He would be there at twelve; he would simply say to the secretary, "I am the expected ambassador."

The President placed the receiver back on the telephone and turned to his secretary:

"That man will be here at twelve. Wait in the outer office. He will say, 'I am the expected ambassador,' and you will admit him to my private office. After that you may go. I will show him out."

"How about the Secret Service, Sir?"

"I do not want them. I have a feeling that this man is not an assassin. I cannot tell you why, but that is just the way I feel about it. He wishes to see me privately, and I wish to show him that courtesy. I want you to follow out these instructions to the letter."

At twelve, exactly, the visitor arrived. He seemed to be a miniature man, hardly larger than a child, with a large head, receding chin, bulging forehead and tiny limbs. A large cape covered most of his body and a peculiarly-shaped hat, which he impudently kept on his head, hid most of his face. At least, it was difficult for the President to give an adequate description of that face the next day to the Surgeon-General. When the visitor sat down in a chair, his feet did not come within six inches of the floor. The first impression that he made on the President was that of some harmless crank, escaped from a dime museum.

CHAPTER III

A Midnight Conference

HE spoke English, but with a peculiar accent; it was perfect English, but it was almost *too* perfect in its tone. There was something almost mechanically refined and artificial about it.

"I presume you are the expected 'ambassador?'" asked the President, as he gravely bade his guest be seated.

"I am," was the reply: "I represent the people called, for a lack of a better name, and because it is a name you well understand, 'The Conquerors'."

"I suspected that. The time of your visit, the secrecy you demanded, everything pointed to the fact that you were in some way connected with the people who call themselves by this peculiar name."

"I will not discuss with you the appropriateness of our name," the little man said with freezing dignity: "I am not here for the sake of debate. The situation, briefly stated, is this: it is necessary for our logical development to have undisputed possession of that part of this country you call Kentucky, Tennessee, West Virginia, Virginia and North Carolina. We want the people now living in those five states to move out within three months. We recognize that a nation as populous and proud as the United States will not agree to such a request without evidence on our part that we are able to enforce it. We have amply demonstrated our power. Do you mind turning the shade a little? My eyes are weak and the light bothers them—that's better.

"Now that you know the hopelessness of any effort to oppose us, you will no doubt realize the wisdom of giving an order to evacuate this region."

The little man finished and gazed, in what seemed childlike candor, at the amazed face of the President.

The President finally laughed, a little nervously to be sure, then checked himself and resumed the gravity that seemed appropriate for the occasion:

"You will have to admit that this is a most unusual request to make of the head of a country that has a citizenship of nearly one hundred and forty million people."

"That is a matter of the point of view. You are yourself an unusual man, at least far above the average American; so you can realize that I do not speak idly. You will set the date?"

"We cannot do it!" exclaimed the President, with more than his usual air of decision: "In the territory you ask us to abandon is Mount Vernon, the home of our first President, and it also holds the sacred ashes of the Unknown Soldier. If for no other reason, these two would be sufficient to make us, as a people, fight to the last man and the last dollar. I am willing to admit that the territory you ask for is not our richest land, but no matter if it were all barren mountains, the people who hold title there have the right to expect protection from the nation."

"You speak strangely," said the visitor, as though he were rebuking a child. "You say it is your land, for but a short time ago you expelled from it the Indians; they took it from the Mound Builders, and the Mound Builders took it from others. What is the ownership of the land? Power, and that is all. We have never before cared for this land, because we did not need it; the greater the intelligence, the less the need for land. We need the land now, however; therefore we ask you to vacate it."

The President's face reddened as he strove to control his anger.

"You speak of intelligence in a way that is singularly impudent. You almost imply that the people you represent, wherever they are and who-

ever they may be, are vastly superior to us in intelligence."

"We are," was the astonishing reply. "We are as superior to your race as you are above the ape or the gorilla."

The President laughed heartily this time:

"Now I perceive this is all a huge joke. As a joke, I want you to know that I appreciate its humor."

"As a proof of my statement," continued the little man calmly, ignoring the outburst of his host, "I will simply say that we have studied your language and are able to talk to you; whereas, up to the present time, you have been absolutely unable to begin, even, to talk to a monkey. We have learned your code and addressed you over the radio; I am talking to you now. Not all of my people can talk your language; but enough of us can do so to enable us to understand your mental processes, though they are so simple that it is not a difficult matter. But I am wasting my time. Will your people get out of these five states willingly, or must we drive them out by force?"

"Don't you think that you had better give us a little time? It will be necessary for me to confer with my advisers, and perhaps the entire question should be presented to Congress. Suppose you put your demands in writing? I will then have it in such a concrete form that my cabinet will be able to understand it."

"All of which means," commented the little stranger, "that you refuse to believe what I have told you. According to your psychology, I am a crank or I am insane. No, I will not place the demands in writing; you are a fairly intelligent individual for one of your race, and I believe you will be able to remember what I have said. To prove further that we possess the power of which I speak, at 3 o'clock in the afternoon, Eastern Standard time, on April 10th, twelve days hence, electric service within the designated area will be resumed for an hour and a half.

"Now, I am going. I took the liberty of parking my air machine on your lawn. Goodnight. I am pleased to see that you made no efforts to stop me. That would have resulted only in many deaths among your people."

He slipped down out of the chair and stood on the floor. The President later recalled that only his head appeared above the level of the top of the library table. Then, without further words, the uncanny visitor walked out of the room.

The Answer of the States

IN a few minutes the President had the Chief of the Secret Service Department in his office for a conference.

"I have just had a caller, Mr. Hopegood," began the President, "and before I forget the details I want to give you his description. A small man whose collar came to about the height of that table. I could not see his face clearly; but I have a general impression of a large head, a bulging forehead and a receding chin. His arms and legs were extremely short, and seemed thin and out of proportion to the rest of his body. He had on a large cape which covered his body and fell down on all sides to the floor. I want you to broadcast that description. We want that man; he may be a harmless lunatic yet, under present conditions, he is a great menace to the country. There is just a possibility that he may be here yet. He said that he came through the air, but that may have been a bluff. Right now he may be on the grounds somewhere. Find him and we have the secret of the trouble.

"That is the first thing. Then I want you to send a personal messenger to each of the five governors of the states which have been attacked, with this message: 'The President wants to see you at once!' Make it urgent. They are to meet me here in Washington as soon as they can get here; that is all. Good-night, and get the men started as soon as you can. And be sure to send good men."

It was four days before the five governors were able to meet the President, and these were four days of anxiety for the chief executive of the nation. The request of the visitor was so fantastic, so absurd that it was impossible for the President to tell anyone about it till the time came for him to divulge the entire matter to the five leaders of the threatened commonwealths.

Most of the actions of mankind are determined by precedent; the human race is governed by the past experiences of individuals and nations. It was all the more distressing to the President to realize at this time that there was no law, national or international, written or implied, to aid him in arriving at a decision. In fact, he was worried more than anything by the knowledge that he would be forced to make before the five governors a statement so peculiar and bizarre that his very sanity might easily be questioned.

So, it was almost with a feeling of relief that he faced the governors in his private office. At least, he would be able to share his information with others, and thus would not have to carry the entire burden of the secret. Would they believe him? Could they? And if they did believe him, what good would it do? What could they or he or anyone do? Fight? Of course! Everyone was ready and willing to fight, but who was there to fight against?

"Gentlemen," he said, and there was a tremor, a gravity in his voice that amply showed the pressure and mental distress under which he labored: "I have summoned you here to confer with me on a matter of the greatest importance. It is unnecessary for me to tell you about the peculiar happenings of the last few days. The air service over your states has been stopped, but not till after many pilots had been killed. All electrical machines of every description have been rendered useless. The people, or person, back of these attacks on your commonwealths call themselves 'The Conquerors.'

I need not go into the details of these occurrences; you know them as well as I do.

"I have asked you to meet me and confer with me over a new development of this affair that has given us all so much concern. I have been in communication with one of these people, and he conveyed to me a demand that is so singular and peculiar in every way that I felt I could give no answer till I had taken the five of you into my confidence. I did not want say a word about the matter to anyone till I had obtained your opinion. While the entire nation is concerned, the citizens of your states are primarily interested.

"The demand is that we evacuate the five states within three months; that means we are to remove all of the present population and leave that territory entirely in the control of these people. I told him, the man who called himself an 'Ambassador,' that such a demand was most unusual. He simply said that he presumed we would leave quietly rather than be forcibly ejected. At the present time his request seems to be the grandiose gesture of a paranoiac, who believes he has unlimited power; but we must remember that so far he has made every threat good. We shall have, eight days hence, a test of his power, to demonstrate that the strange phenomena are under his control. I speak of him as though he were the only one concerned; I do that because I am at this time absolutely uncertain as to whether he is acting for a group, a nation, or simply for himself. Our promise of a princely reward has brought no results. That is the situation. What is your advice, Governor Bawlding; suppose you start the discussion!"

Bawlding of Virginia stood up. He was one of the few old-time politicians who had retained his power in spite of the great shift in party management. In his frock coat, his low wing collar and polka-dot tie, he made an impressive figure. With every few sentences he took his hand and swept the tangled locks of hair back from his leonine brow. He tried to speak softly, but at times he roared. He forgot that he was addressing five men, and put power sufficient to captivate thousands in his reply.

"My state, Virginia, is rightly called 'The Mother of Presidents'. Always she has led in the march of progress, humanities, and republicanism. Her soil is still hallowed by the graves of the Revolutionary heroes and the Founding Fathers, and cemented by the blood of the devoted brothers, North and South, who perished there in the great war between the states. We have never yielded to force a foot of soil; though some of our western counties were so badly advised some years ago that they formed a new state.

"There is only one answer I can make for my state, and that is, *we stay!*"

A Hydrocephalic Dwarf?

HE sat down. It was not a long address, a lengthy peroration, but it was the keynote of all that was said after that. The other four governors spoke; but all they could do was to repeat, with emphasis on matters of state pride, the defiance of the Virginian. At last the President replied to them:

"We will do nothing," he said: "That is, practically nothing until April 10th. The Secret Service will in the meantime devote their full strength to the problem. It is possible for the Secretary of War to call sufficient reserves to increase the strength of the regular army by fifty thousand men; so that, at any time you need help, I will be able to send you adequate forces. I presume that this man or group of men will soon communicate with me, if he be able to demonstrate his power on the 10th. When that happens, our answer will be a very decisive and very short 'No!'

"In the meantime, I think that we six had better keep this entire meeting a secret. I am sure that we can depend on the courageous co-operation of the entire country with the population of your five states; but I do not want to start a panic. If thousands should start to leave at one time, there would be a great deal of suffering and a complete depression in business and land values. I feel that we should simply wait and make these 'Conquerors' show their hands. I am in hopes that at any moment the Secret Service will get to the bottom of the trouble, and put a stop to all the annoyance and worry it has caused. Keep in touch with me, gentlemen, and consider that the entire resources of the nation are at your disposal."

The conference had hardly ended when the Surgeon-General called at the White House and asked for an interview with the President; this was at once granted.

"After your talk with me a few days ago," the Surgeon-General said, "I at once started my hunt for a hydrocephalic dwarf. I have located over thirty who seem to be very similar to the man you described to me. I have a list of all of them, their residences and occupations, and it will not be difficult for the Secret Service to investigate them. Unfortunately, for the theory which has been presented, more than two-thirds of them are inmates of institutions for the feeble-minded or insane, and the other third are harmless individuals. Not one of them seems to have the required ability to work the slightest part of the damage done in the five affected states."

"What did you say is the name of the disease?" asked the puzzled President.

"I called them hydrocephalic dwarfs. The deformity is caused by a great increase of fluid within the skull and, as a result, the head enlarges, out of proportion to the rest of the body. The face seems small, the chin receding and the forehead bulging. The body never grows very large; therefore most of these persons are very much under the average size. The majority are feeble-minded, but occasionally one becomes very brilliant. During the

middle ages they were used as court jesters or 'king's fools.'"

"And you think that this man who called on me belongs in that class?"

"It seems so, according to your description."

"Then I think that we had better identify every case which exists in the United States, and place them all under the closest observation; because this man, if he has the power he pretends to, has already been the cause of great suffering and financial loss that cannot at this time be estimated. It appears absurd to think that one man can work such havoc."

"Perhaps there is more than one?"

"You find that out, and you will be worth a million dollars!" exclaimed the President.

CHAPTER IV

An Unfortunate Shot

AMONG six men, at least, in the nation the approach of the 10th of April produced a state of acute mental tension. If the dwarf should prove himself to be a member of "The Conquerors" by restoring electric service in the states for an hour and a half, then it was almost certain that "The Conquerors'" threats might be made good. If, however, nothing should happen on that day, then the President's strange visitor might be classed with hundreds of other men with delusions who were bombarding all government officials with letters, telegrams and telephone calls of advice and threats.

At practically three o'clock, great shouts went up in the cities of the stricken states; for all electrical equipment was found to operate as if nothing had happened. And for an hour and a half the people rejoiced, believing their troubles to be over. Their consternation was great, however, when at precisely four-thirty, like a sudden plague, the electrical equipment was stopped again and activity in those states ceased as suddenly as it had been resumed. A hush of despair swept over their population.

And in six executive offices six men sat back in their executive chairs with the weariness of defeat marking their faces.

On the twentieth of April, the "ambassador" again called over the telephone, asking for another conference with the President. This time there was no delay, for the meeting was at once agreed to; it was to be held, like the first, at midnight.

But at this meeting, all arrangements were in readiness for the capture of the "ambassador." Now that it was proved that he held the key to the mystery, it was felt that with his apprehension the entire problem would be rapidly solved. The President, personally, did not like the idea of setting a trap for the man, but the Secret Service Chief insisted on it and had his way.

The President was at last persuaded that the "ambassador" must be placed under control, and force used to make him tell his secret and give the necessary information concerning his fellow conspirators, if he had any. The Surgeon-General was instructed to be at the White House, also the Superintendent of the government's Hospital for the Insane, in Washington. A dozen men from the Secret Service were hidden in the room and adjoining offices, and a squad of marines were at hand, prepared to answer any calls made on them. The scene of the ambush looked as though the President were alone; in reality there were six other men in the room beside himself.

The grounds also were guarded, as a determined effort was to be made to capture the airplane or automobile in which the visitor would come. However, this part of the plan was a failure; since the dwarf walked to the front gate of the White House grounds. Here he simply announced himself as the "ambassador" who had an appointment to call on the President at midnight. His method of announcing his visit, his apparent inability to realize that a trap might be laid for him, his supreme egotism, showed plainly his megalomania. He considered himself a being far superior to the President, and all of his conduct showed his profound confidence in himself.

As before, he walked calmly into the office where the President was waiting for him. Without salutation or introduction of any kind he began:

"Have you set a date for the evacuation?"

"I have not. We are going to stay. Not a single person is going to leave the five states. What are you going to do about it?"

"Make them leave! There is no desire on our part to kill large masses of people. That used to be a popular pastime in centuries gone by; but we consider such methods crude. We hoped that your intelligence would be sufficient to make you realize that you are opposed by a force superior in every way to your own. You should reconsider the matter."

"No! Our answer is final. And we want you to stay here with us. We are going to examine you. There is a doubt in our mind about your mental health."

The stranger laughed; it was a peculiar unearthly laugh.

"You will have to excuse that attempt at laughter," he finally said: "None of our race has laughed for centuries; but, when we started to learn your language, we were impressed with the fact that at certain times you make a peculiar noise to indicate your ridicule of certain matters, or to show that you are pleased. So, a few of us have tried to learn to make that peculiar noise you call laughter. Well, I must be going. I am sorry—"

The President stepped toward him. As he did so the "ambassador" raised his right hand in what seemed a menacing gesture. A shot rang out and the little fellow dropped to the floor.

"Who did that?" exclaimed the President, sternly. "The last thing we wanted to do was to hurt this man."

"I did it," said one of the Secret Service agents:

"I thought he was going to shoot you and I shot first."

Immediately the two doctors present started to examine the wounded man. A moment's examination was sufficient to show that he was badly hurt, but still conscious. He simply looked at the men around him. His cape off, his clothing opened to the bare chest, he looked pitifully childlike. There was no doubt now about his large head, prominent forehead and little weak chin. His hands seemed large for the arms, while the feet and legs were puny in proportion, even to the arms and certainly to the rest of the body. The chest was large, the abdomen small.

Examination showed that he had been shot near the heart (the autopsy later was to confirm this) but the liquid pouring from the wound was not red; it was of a peculiar pink, milky consistency. The Surgeon-General commented on this fact as he endeavored to stop the flow. The dying man looked at him:

"The ichor of the gods!" he exclaimed.

For several minutes no one spoke.

Then the stranger looked intently at the President and whispered: "Fools! Fools!" His form relaxed. He was dead!

"Too bad; too bad," sighed the President: "A useless killing. Not only that, but his information dies with him. At least make a thorough search of his clothing; for perhaps he may have some papers on him that will lead to an identification. I think that an autopsy is in order. Also I feel that this affair must be kept from the newspapers. If this man has confederates, it would be best that they should remain uncertain where he is. It will be worth while, gentlemen, to make another check of your list of hydrocephalics in the United States. If one is missing, it may be this man; and that may furnish us a clue as to his identity."

A Report

THE commands were carried out by the Secret Service. In two days they were able to report that all of the known hydrocephalic dwarfs were alive and in their usual locations. This was before the report of the pathologists who were making the unusually-protracted autopsy. Had the Secret Service waited for that report, they would have realized the uselessness of any search for the identification of the dead "ambassador" as an American resident.

The report, written in ultra-scientific language, was read to the President and his cabinet by Dr. Howell, head of the pathological department of Johns Hopkins University, who had been asked by the Surgeon-General to perform a complete autopsy. The President and his cabinet listened patiently to the end of the report; and then the President turned to the Surgeon-General, and in a tired but patient voice asked:

"Will you please tells us just what this means?"

"It means simply this, gentlemen. This stranger who looked like a hydrocephalic dwarf was, really, *not* a deformed human being. The autopsy showed definite evidence that what we thought, at first, deformities, are in his case normalities. *He was not a human being, such as we are!* For example, his blood is different. It was pink, instead of red, and the cellular composition shows differences. His respiratory system, in proportion to his weight, is at least twice the size of the average man's while there is a compensatory shrinking in all his abdominal organs. In fact, his organs of digestion are greatly different from ours. Much simpler in a way, and they may have been more efficient, though we do not know just what his food consisted of. His brain is very large. It was not a case of hydrocephalus; but an increase in actual brain tissue which gave him a brain twice as heavy as that of the well-educated man of today. The feet are very small, the muscles of his legs almost shrunken. Yet his hands are very large, and the muscles of his fingers highly developed. We have not received a final report from the microscopist; but it is evident that the nervous system connected with the eyes is very highly organized. The lower jaw is small and the teeth almost missing. This does not mean that he was an old man, and that they had fallen out; but rather that he never had very many. There are practically no organs of sex."

"Certainly a most peculiar being," commented the President, "in many ways very different from the average man. How do you scientists explain it?"

"I hesitate to tell you. That very matter of explanation has given us all the greatest concern since the first minute of the autopsy. This is our final conclusion, and I am not asking you to believe it in any way.

"For years the anthropologists have felt that the human race has been changing. They have made a careful study of the shapes of skulls and of the few bones of past ages that they have been able to discover in the geological strata. They have felt that man has not always been as he is today, but that he has gradually evolved to his present shape.

"It would have been impossible for any scientist to have had such thoughts without, at the same time, dreaming of what man might be in the future if certain changes kept on for another hundred thousand years. More than one scientist has made statements describing the human being of the future. Novelists, like Wells and Verne, have written fanciful accounts of races that will develop centuries from now.

"All we can say is that this man, who was killed in your office and whose body has been so carefully studied, is probably an example of what our race will be like in the future. His body closely resembles that described as possible for human beings a hundred thousand years from now. Certain changes in human anatomy which we have felt to be taking place, but very slowly, at the present

time, appear to have already taken place in his body.

"Nature plays tricks. It may be that some Supreme Power, in a moment of abstract inattention, moved forward the clock of time a hundred thousand or a million years, produced one being of that age, caught himself napping, and gone back hastily to the present. But, in doing so, it either forgot to destroy this creation or decided that it was best to let him live. This, Mr. President, is not a scientific explanation, but rather a dream in which we have been indulging for the last two days."

"But was there only one of them?" asked the President.

"Who can tell? Perhaps a million," was the startling answer.

The President was not a scientist and certainly not an anthropologist; but he had sufficient general education to see the point of the Surgeon-General's explanation of the findings of the autopsy. They were, however, so far as he was concerned, just one thing less to worry about. Late that afternoon he had received a long-distance telephone message from Governor Johnson, of North Carolina, to the effect that automobile transportation had suddenly been resumed and that all of the manufacturing plants dependent upon electricity had been able to start. The telephones and telegraph were working normally and, to make a long story short, things were normal in North Carolina. Soon after a similar message came from West Virginia and, within an hour, the President had received satisfactory messages from all five of the threatened states.

That seemed to solve the problem. Evidently the little dwarf, who called himself the "ambassador" from "The Conquerors," was the key to the situation. Perhaps he was the sole being who had been responsible for the changes that had caused so much disturbance to the nation. With his death the entire structure had toppled, and the menace was removed.

More than ever the President felt that this one peculiar personage had been alone in his threat to humanity at large. He was an anomaly, born of some strange parentage; he had secured a scientific education that had made it possible for his extraordinary mind to gain some of nature's secrets, hidden from the average man. With these in his power he had become grandiose, possessed of the idea that he could rule the world. With him had died everything that he knew; that fact might be a loss to humanity and then, again, it might be a gain. Perhaps it was not well for one man to know too much.

The President regretted his death; it would have been much more satisfactory if the stranger had been captured and questioned.

But now that everything was normal again, perhaps it was better that the man was dead. Certainly the Secret Service operative was not to blame; in acting as he had he thought that he was saving the President's life, since he had been unable to see clearly just what the man had in his hand.

The next afternoon, at four, radio service throughout the United States was again interrupted; presumably as a signal that, at eight that night, another message would come through the air. That was, to say the least, very disturbing to the President, as well as those who were in his confidence. A personal interview with an "ambassador" could be completely hidden from the public; but a radio message in the International Code became at once the property of every newspaper and through them of every reader of the daily press. An effort was made to soft-pedal the press, by sending out a special plea from the White House to use the greatest caution in giving information to the public. That had succeeded at times and then, again, at others it had failed; this time it failed.

As before, the President and his cabinet met to receive the message. Promptly on the stroke of eight, the code words came tripping through the air. This time the message was longer than before. At last it came to an end and the radio expert who had transcribed it read it slowly and distinctly to the waiting audience.

> *"Attention. Attention. This is the broadcast station of The Conquerors speaking. The United States, having disregarded our efforts for a peaceful compromise and having killed our ambassador, has created a state of war. We have permitted the resumption of all electrical power in the five affected States, so that their citizens will have ample means of vacating these lands. Our advice is that they do so at once. Signed, The Conquerors."*

Coming of the Mist

SUCH was the message that was broadcast to all parts of the United States. It was impossible to keep news of such importance from the nation; some newspapers observed silence in respect to the President's request, but the majority of them printed the message with more or less comment. The general opinion was that the time had come for action. All the editors agreed that something should be done; but none of them gave any indication of just what they considered that "something" was.

Meanwhile no one discovered anything that entitled him to the reward of a million dollars. As before, there was an abundance of freak suggestions, but nothing of real worth.

The governors of the five states stood firm in their attitude. All of them issued proclamations, acknowledging the demand to vacate the land, making vague reference to the source of that demand, and leaving it to each family to decide for itself what it wanted to do. Every effort was to be made to assist those families who wished to leave but who were unable to do so on account of their impoverished financial condition. The Red Cross offered to help. The National Government set aside a hundred million dollars to cover the emergency. The

New England states suggested that their abandoned farms serve as shelter for those who wished to continue a rural life.

A small part of the population moved; the greater number stayed. After all it was just a peculiar, unexplainable threat, which no one really understood. What was there in that to make them leave the homes in which some of them had lived for ten generations?

For a while, nothing happened.

In fact, there was such a long pause that people began to say that nothing would happen.

Then came the mist.

It arose first in West Virginia and at the end of four days simply covered that state with a blanket of fog. No one could explain it satisfactorily. For a few days at a time there had been fogs in coastal cities, but these had always disappeared. This fog in West Virginia was more than a fog; it was a heavy, thick, almost impenetrable, blanket of dampness. And with it came semi-darkness. Everything became wet and uncomfortable. The houses, clothing, bedding, furniture, woodwork, all gathered great drops of precipitated moisture. Life was difficult under such conditions. It seemed hard to breathe, and it really was impossible to keep dry. Fires in the houses seemed only to make the humidity worse.

From the mountain tops of the state it seemed that all of West Virginia was covered with an ocean of fog, great billowing waves of mist. The level crept higher and higher till the misty ocean overflowed into Virginia, following in great tidal waves the valley of the Potomac and burying everything in its gray ugliness. Parts of Maryland were covered. Westward the waves of mist rushed over Tennessee and Kentucky.

Separate areas of mist began to appear in other mountainous districts. In less than two weeks the five states and considerable acreage in the adjoining states were completely covered by the heavy wet mantle.

And that was all! The Government issued bulletins which indicated that as soon as the wind changed the mist would disappear; it was just a peculiar, natural condition of the atmosphere and nothing to be alarmed at. That was all well enough for the experts at Washington to say; but it did not sound so very well to the persons who had been living for three weeks in an atmosphere of dark wet gloom. People began to ask each other how long they could exist under such circumstances.

There was some fog in the District of Columbia, and at times the cloud of mist extended across the river at Memphis, but, as a general rule, only the five states were affected. Occasionally there was a drizzling rain but this lasted only a few hours. All the rest of the time there was simply the mist and the dark, wet clouds that seemed to come down and cover the earth with an unpleasant moisture.

To add to the distress of the inhabitants, everything started to decay. Houses, furniture, bedding, clothing, food supplies, tools, all seemed to literally rot away. Everything became hard to handle and unpleasant to smell. Food in abundance was provided by the Red Cross; but it soon mildewed and became unfit for use. Metals seemed to rust away as easily as wood or leather decayed. And, under this double strain, the courage of the people began to crack.

Within a month they wanted nothing so much as to see the sunshine and, for at least a little while each day, wear warm clothes and have dry skins. It was tiresome to have to have lights burning all the time in the house, to feel the way down the road and constantly to be drying clothing before the fire. If there were farms in New England, sunshine and food in the West, why should they stay and drown in a world that threatened to be one of perpetual slime?

So, they began to leave! On foot, and in covered wagons, and in automobiles of every vintage, they took with them their household goods, or at least the part that was not completely rotted and seemed to be worth saving. The trains were loaded to capacity. The government sent great auto-buses to the more remote regions to transport those who had no other way of traveling from the accursed land.

The state governments did their best to encourage the people to stay in their homes; it was believed that the worst was over and that the mist would soon rise. But by this time no one wanted to believe such news. The residents of these states had been through six, seven, eight weeks of the mist and that was enough. If they had suffered eight weeks, there was no reason why the mist should not last eighty or eight hundred weeks. The land was doomed. Now was the time to get out, before their colds and bronchitis became so severe that they could not travel.

A Deserted Country

IT was expected that, of all the people in the five states, the mountain folk would be the last to leave. For over six generations they had clung to their mountains, looking with disdain on the valley and river folk. What was weather to them? They were accustomed to living out of doors. But they were not accustomed to fog and mist and a continual, cold dampness in the summer time and when this curse descended on them, word was passed from mouth to mouth that the world was near the end and that the mountains were to be cast into the sea. That was Bible! That was the prophecy! When that happened, they did not want to be on the heaving mountains. Better be with the rest of their kith and kin.

So, it happened that the urbanites, the city dwellers, the people accustomed to the discomfort of the crowded beehives, remained in their habitations longer than the mountaineers. But, eventually, they also left. The states were losing their population by tens of thousands each day. The exodus

was irresistible. At last the five governors had to acknowledge that they had been defeated and that they no longer had a people to govern; therefore, that they might as well leave for a healthier country themselves.

Two months passed and then three. The mist grew heavier, if that were possible; but there were now no observers of its devastating effects. Vegetation grew rampant; ferns, vines, weeds of all description pushed their tall stalks upward. All plant life had moisture but no sunlight. Yellow and white became the predominant colors of valley and mountain instead of the green, resulting from the life-giving chlorophyll. Trees that were young made rapid growth; old trees decayed and fell as rapidly. Wooden houses almost melted away into their cellars; while structures of brick, stone or cement become covered with mildew and vines that penetrated every crack, as though endeavoring to tear the building to pieces with their long white fingers.

Railroad tracks rotted and rusted. The long white strips of concrete road became covered with moss. In the cities, abandoned skyscrapers thrust their lofty towers to a sky that no longer carried larks or threw down sunshine to strutting pigeons. The sewers clogged with loathsome vegetation and the blocked mass over-ran the streets till they were covered over by a thick blanket of parasitic moss.

Now and then a government observer would make a hurried trip through a special part of the doomed land; one of these men spent three days in Memphis. In his report to the Governor of Tennessee, he said among other things:

> "I feel that the city of Memphis is doomed. Of course, there is a possibility that, if the mist clears at once and sufficient funds can be obtained, something can be done to restore it to its former greatness. However, half of the residential section is already so rotten that it would be dangerous to resume living in the houses. All the business section would require such extensive repair that it is a question as to whether it would not be cheaper to tear everything down and build anew from the ground up.
>
> "The amount of insect and reptilian life is astonishing. It is almost impossible to walk without stepping on a small toad or lizard. Flies and mosquitoes make life almost unbearable; and any food left for a few moments becomes covered with white ants.
>
> "There are a few cats and dogs in the city. The dogs are ferocious because of the lack of food and they all seem to be in a sickly state.
>
> "I do not believe that such animals can survive the climate. During the five days I spent in going over the city I failed to find a single person. The city is without life, absolutely deserted. If the fog keeps up for a year, it is reasonable to believe that the city will rot to the ground."

At the end of six months the fog and mist were still clinging, like a living death, over the deserted states. The nation had calmly accepted the condition as inevitable and all the resources of the republic were being used to help the fugitives adjust themselves to life in new surroundings. All talk of resistance had stopped. What was the use of fighting when there was no one to fight? Why worry over the inevitable? For some reason life had become impossible in those five states; but there was still lots of room for everyone to live in, and the nation was able to supply food and clothing and shelter. After all, it might have been worse. A few had died of exposure but, if there had been a war, how many would have been killed!

It was still impossible to use an airplane over the deserted land; but an observer who crossed it from the coast to the Mississippi River reported a white mist, with only an occasional mountain peak sticking through, was all that could be seen. Occasionally, an effort was made to observe conditions from a plane; but, in every instance, the engine went dead just as it reached the equally dead country.

Exactly six months after the appearance of the mist, another message came over the radio. This one was short and absolutely clear in its meaning; in International Code it proclaimed its threat:

> *"Attention. Attention! This is the broadcast station of The Conquerors speaking. Now that you are out, stay out!"*

That made many a red-blooded American angry; but what reply could be made?

CHAPTER V

The Mist Clears

THE mist lasted exactly one year: at the end of that time, it started to clear and, in another month, the atmospheric conditions over the five desolate states were the same as they had been prior to its appearance. Once again the sun shone into the valleys and illuminated the mountains with splendor. Twilight painted, as of old, the skies with somber but multi-colored beauty. The full moon flooded the river valleys and hilltops with silver. Everything above the earth was the same; only on the ground was there any difference.

The earth, everywhere was covered with moss or sunk in slime, the slime of death and decay. Little towns had disappeared. Cities were falling apart. All of the works of man were dropping back into the dust from which they sprang. There were no men, no animals of the mammalian group; the reptiles ruled again the land after a lapse of millions of years.

Since the final message to *"stay out"*, the land had been silent. That message had been given wide distribution throughout the nation. There was now

no doubt in the minds of the leaders of the United States that, whoever "The Conquerors" were, they had in their possession certain scientific powers by which they could enforce their will. Certainly, so far, the nation had played a sorry part in the conflict and that part, while unavoidable, made more than one man blush for shame. But there were those who cried aloud for the nation not to anger "The Conquerors," lest they spread their horror over the rest of the country.

But the nation as a whole could not forget that every inch of the abandoned territory had once been gained at the cost of human life. It had been the boast of the land that, once the Stars and Stripes were raised over any land, they were never taken down. Now, in a little over a year, five of the great commonwealths had been abandoned to an unseen and unknown enemy. At the end of that time, the mist had gone as mysteriously as it had come. The five states were now ready for re-occupancy. But there was the threat:

"Now that you are out, stay out!"

The President requested the five governors, who still retained nominal office in spite of the fact that they had no people to rule, to issue proclamations; urging the former population of the states not to make any immediate effort to come back to their homes, and stating that plans for return would be made in due time, but that a re-entry too soon would possibly lead to far greater disasters than had come before.

On the same day the President called a special session of Congress to consider ways and means for the rehabilitation of these ruined States. He considered that it was a serious matter in which the entire nation should have a voice. Secretly, he was afraid that Congress would decide to reoccupy the abandoned territory. He felt that such a course would only cause future disturbances, the gravity of which he was unable even to imagine.

In spite of the efforts of the governors several people went back into the forbidden territory. They simply went in and disappeared—nothing more was heard from them. One group of scientists not only were well equipped with radio transmitters and receivers, but also took with them, on spools, many miles of electric wire for telephone service. They also disappeared and sent back no messages. These apparent disasters made the President feel only more keenly the dangers of hasty action, in settling the rehabilitation problem.

The offer of a million dollars reward still remained; no one had ever offered any solution that entitled him to the money. In a secret conference with the leaders of the Senate the President had expressed himself as being in favor of either rescinding this reward or of increasing it to one hundred million.

"Everybody has his price," he stated, and he was frank in his belief: "No man living is so honest that he cannot be bought for some price. If we increase the reward, it may be that we can find a traitor in the camp of the enemy."

Congress met. There were patriotic speeches in unusual number. A Tennessean, known among his friends as "The Black Bull" rose in the house of representatives and, by a flight of oratory, almost threw that body into a condition of hysteria. Cheers followed his statement that he himself would leave the house at once and personally lead the mountaineers back to their humble homes. Tears flowed freely as he declared that, only under the soil of his native state, could he rest happy till the trumpet called him to appear before the Great White Throne. From all parts of the house, politicians rushed to him to congratulate him on his wonderful oratory. After it was all over, a representative from West Virginia took him to one side and asked him when they could start back home. The Tennessean sadly said that he would like to go at once, but that his business affairs in New York City demanded his presence there for an indefinite period.

At last Congress appointed a joint committee from both houses, with full authority to act, appropriated a billion dollars for the relief of the expatriates, cancelled the long-unclaimed reward, and adjourned. The committee met, organized, and adjourned to meet again in three months. It all was a beautiful example of the efficiency of republican government.

All this time the world had been watching the unusual course of events with the greatest interest. Several of the nations had attached, to the staffs of their legations, scientists who had no other function than to write full accounts of the peculiar and unheard-of cataclysm that had fallen, in such an interesting, even though terrible, manner, on this nation. These reports were forwarded to the various departments of state and foreign offices; naturally, they were not complete, for only a few men in the whole country new the inside story.

Sir Harry Brunton

AS the Surgeon-General of the United States entered his office one day after lunch, he was handed a card. It bore only the name:

HARRY BRUNTON

The Surgeon-General searched the files of his memory for an instant, and quickly identified the name with that of a famous English anthropologist.

"Show Sir Harry into my office," he instructed the aide; the latter withdrew for an instant, and returned, escorting a bronzed man of middle age, whose rugged, though not unpleasing, features were stamped with the distinction of their wearer.

"Sit down, Sir Harry," said the Surgeon-General, greeting the distinguished scientist and explorer: "My time is my own for but a few minutes this afternoon; but it will be a pleasure to learn in what way I may be of service to you."

"My errand," returned the Englishman, "while scientific, is none the less—confidentially—official. This letter from the Prime Minister will vouch for

the fact that I am here on behalf of His Britannic Majesty's government——"

"But, my dear sir! If you have a letter like that, you should have gone at once to the President. All important visitors—you know—just a matter of courtesy. Let me telephone and make an appointment for you."

"I have seen him. He asked me to give you this note."

The Surgeon-General tore open the envelope and read in the President's characteristic scrawl, the words:

"Dear Bill: I do not know what Sir Harry wants, but we have a direct request from the Premier to give him any help in our power. Use your own judgment, but do not embarrass him in any way. Yours, Charles."

The Surgeon-General laughed, tore up the note and turned to his visitor, as he said,

"The President and I went through preparatory school together; he then studied engineering, and I medicine. Naturally, we are still close friends and at times his notes to me are anything but diplomatic. Now I am at your service, Sir Harry. What can I do for you?"

"Simply this. Some time ago a mysterious man was calling on the President and was accidentally killed by a Secret Service man. Am I correct in this statement?"

"Perfectly; though the truth is known to only a few persons."

"After his death an autopsy was performed by Dr. Howell of Baltimore and the results of that examination were reported to the President. Is that correct?"

"Absolutely."

"What I desire is your permission to read the report of the autopsy and, if the bones were preserved, to examine the skeleton."

"May I ask why?"

"You certainly may. Our government is interested in every way. We feel that there must be a definite connection between that body and the very remarkable series of natural phenomena that have been taking place in the east-central part of your southern states."

"But, my dear sir. Pardon my abrupt way of speaking; but the things that have taken place in the United States are strictly the business of the United States."

"Of course. But you will realize the situation if we should be threatened with similar events in our empire."

"That is true," agreed the Surgeon-General: "I guess you are right. I have one of the three copies of that report in my safe; I will let you see it and you may copy any portion of it that you wish. I will also give you a letter of introduction to Dr. Howell. He has, I believe, preserved parts of the body for further study. You will pardon me if I remain in the office with you till you finish the study of the report; I am holding myself personally responsible for its confidential nature."

He went over to a strong, though small, safe; opened it, took out the report and handed it to the English visitor, with the suggestion that Sir Harry make himself comfortable and put as much time on it as was necessary. For the next two hours his visitor simply read and re-read the report; at rare intervals paused to smoke a cigarette and gaze contemplatively at the ceiling. At last he arose and handed the sheaf of papers to the Surgeon-General, with the simple remark:

"By Jove!"

"Odd, isn't it?" asked the American.

"It certainly is. My word! Thank you a thousand times for the courtesy. Now I must travel on to Baltimore. May I have a letter to the man who made this report?

"You certainly may. I have it all ready for you. But I was in hopes that you could stay and dine with me."

"Fine of you to ask me, but my time seems to be limited. I will let you send me over in a car, however, and—what say—will you wire over and make an appointment?"

"I'll do that. Howell is a fine chap. By the way! There is something more that might be of interest to you. When that man was shot, I commented on the peculiar appearance of the blood. He looked up at me and said,

" 'The ichor of the gods!'

"And soon after that he said, 'Fools. Fools!' before he died.

"Ichor, as you of course know better than I, is originally the blood that flowed through the veins of the mythological gods. Lord Juss, King of Witchland, had seven white mares, all sisters, and they had ichor in their veins instead of blood. You read the report of the man's blood; it looked more like a pink water than the blood of a human being. I thought you might be interested in that detail."

"Interested? My word! And this man actually called on your President and talked to him?"

"He certainly did. Here is something else; he told the President the first night that his people are as far above the human race in intelligence as we are above the apes. He said that he had learned to talk our language whereas, so far, we could not talk to the apes. That was some argument, wasn't it?"

"It certainly was. But send me on my way. When I have time, I should like to talk that over with the President if I could."

"I think he would talk."

That evening Sir Harry Brunton called on Professor Howell. Arrangements had been made for the interview, and the professor had suggested that it would be best to meet at the pathological department of the university. The reception accorded the Englishman was a warm one; Dr. Howell, who knew of the man and the wonderful work that he

had done in anthropology, was more than glad to be able to talk over the case with him.

"It is a treat to show you this case, sir," he said: "There are so many features of it that make me realize my own scientific deficiencies. I know what I see in this skeleton, and I believe my description of the body is as accurate as any man could have made it; but I do not understand what it all means. Here is the skeleton, and here are some microscopic slides and a detailed description of the nervous system. We saved one-half of the brain intact, while we sectioned the other half to study. That brain, Sir Harry, was the most unusual specimen I have ever seen."

"Let me get to work," was the only request made by the Englishman.

At midnight Dr. Howell served coffee and sandwiches. At five in the morning he served a light breakfast. At ten that morning the Englishman started to walk around the room:

"You people made a serious mistake in killing this man. Dead, his body offers a thousand questions that, living, he might have answered. I am sure of one thing, however, there is not a single evidence of degeneracy here. This is a human being who has gone upward, not downward, from man as we know him today. There is nothing in past ages that will answer these questions; the solution lies in the ages to come. Now I want to know one thing. Have you any more beings like this in America? I mean live ones?"

The American smiled:

"Not that we know of. You ought to be aware of the fact that for over a year a reward of a million dollars was waiting for any information concerning these people. We do not even know whether he had any confederates, or if he were not simply a peculiar product of nature who had become gloriously insane."

"And that is all you can tell me?"

"Absolutely all. But what do you think?"

"I cannot tell you. Guesses? Certainly. Anyone can do that. How about the deserted land? Anybody there now?"

"No. The government is trying to keep everyone out till some decision is reached by the congressional committee. I understand a few parties went in, but they have never been heard from again."

"And there is no mist there?"

"Not now."

"That's odd."

"The whole thing is."

"I should say so! Well, I must go on my way back to New York."

"Won't you stay and visit the University? Our classes would be delighted to have you lecture to them."

"No time. This thing is bigger than formal lectures to students. Sorry. Must be going. You'll hear from me again."

CHAPTER VI

An Unusual Advertisement

MALLORY WRIGHT, in a hurry as usual, rushed into the apartment of his friend, John Ormond:

"Say, John," he cried, "didn't you tell me you were born and raised in Western Tennessee?"

"I sure was born there," laughed Ormond, who, as usual, was cleaning a rifle: "Right there in the Reelfoot Lake region. Been there yet, only I had to make a living someway; so, I came East and got that job in a broker's office. Wish I was back home again, though nobody is there now. All my folks went to Arkansas when the mist came."

"Good! Here is an advertisement which I bet you are the only man in the city can answer. You never read the papers, so I just had to come and show it to you. Listen to it!

> "Wanted at once. A wide-awake, energetic American scientist who knows how to shoot and is acquainted with the region of Tennessee around Reelfoot Lake. Apply in person only at the British Consulate tomorrow at 3 p. m. A good opening for the person who can show that he is qualified."

Ormond looked up in disgust.

"One word spoiled it. You know what kind of a scientist I am; just about able to tell an atom from an Adam's apple."

"You don't get me at all, John," insisted Wright: "You are not going to answer that advertisement."

"No?"

"I should say not. *We* are. Understand? *We* are! That makes the correct answer. We have what the man at the Consulate wants. We know all about the lake; we can shoot and I am willing to match my general knowledge of science with anyone of my age in the city. Things are not going very well in the laboratory and I quit today. It is hard to work with a man who knows less than you do. So, I am out of a job, and I know how long you will stay with that broker if you have a chance to shoot. So, let's rush around there tomorrow afternoon and be the first in the line; only I am sure that there will not be much of a line. Just the two of us. I do not know what the pay will be, but we can divide it and I guess we will have our expenses paid."

"It's a go!" shouted Ormond, putting the rifle back in the rack, and then his face clouded again: "But what's the use. This guy don't want to go to Tennessee; all he is going to want is a lot of information. Besides, no one can go there. The government says so."

"Let's see what they want, anyway."

That was their final decision. And the next day they were at the British Consulate an hour before hand. They looked around the waiting room anxiously, but it was empty; it was still empty at three. They walked over to a clerk and stated that they

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The Opel-Sander Rocket plane in which Fritz von Opel made a successful flight of 1¼ miles. Von Opel is in the cockpit of his plane. (Times Wide World Photos)

The Rocket Comes to the Front Page

IN view of the events that have occurred in the past few months, one can say that the rocket has definitely come out of the field of speculation and hypothesis, and is now in the area of serious experimentation. By the recent experiments of Professor Robert H. Goddard, of Clark University, the American exponent of rocket flying, and of Fritz von Opel and Max Valier, of Germany, the question of rocket flying has come to the front pages of the newspapers of the world.

Although Otto Willi Gail, in his prophetic story, "The Shot Into Infinity," which appears in the Fall issue of SCIENCE WONDER QUARTERLY, was not altogether correct when he stated in his preface: "Perhaps the first rocket is hissing on its way into space before this book leaves the press," we can realize that he was not far from wrong; because, as he predicted, serious and successful experiments on rockets will be made in the near future.

Four men, all told, are in the forefront of the work on rockets. They are the three just enumerated and, in addition, Professor Hermann Oberth, an Austro-German scientist. The work of Professor Goddard, inasmuch as he was the first to make an experiment of any magnitude, demands first attention. On July 17, 1929, he shot up into the air near Worcester, Mass, a rocket a photograph of which appears on the next page. An outer cover of metal enclosed this rocket. The newspaper reports of the experiment state that the rocket exploded in mid-air, and that it was a failure in an attempt to shoot the missile to the moon. This, however, was not altogether the case. Professor Goddard, in his experiment, was trying to determine the power of a rocket using a liquid propellant of high energy. The rocket functioned perfectly, according to Professor Goddard, and the experiment revealed that what is necessary is only solving the question of stabilization of the missile in flight. This was the first flight made with the use of a liquid propellant, and it was of great importance; inasmuch as these propellants offer much greater possibilities of reaching high altitudes than do powder or solid explosives.

> ***I am sending a photograph, however, taken in the laboratory, with the smokeless powder rocket which gave a speed of the ejected gases of 8,000 ft./Sec., nearly a quarter of the speed necessary to give a body to escape the earth's attraction, which you may find of interest.***
>
> R. H. Goddard

The rocket was not intended to be shot beyond the earth's attraction. The experiments were carried out with funds contributed by the Smithsonian Institution at Washington, D. C., and were the preliminaries to the building of a rocket to explore the upper atmosphere; for this is deemed by Professor Goddard to be of the most immediate scientific importance. In the box is an excerpt from a letter from Professor Goddard telling of his powder rocket which attained a speed in the ejection of the gases of 8,000 feet per second in an actual experiment. This speed is nearly one-quarter of that necessary for a body to escape the earth's attraction. It can therefore easily be seen that, even with the smokeless powder, the progress which is being made is extremely rapid and highly gratifying.

Above is shown an Opel-Sander rocket plane which made a successful flight of 1¼ miles on September 30. Using a powder propellant, Fritz von Opel was shot along a track near Frankfort, Germany, rose to an average altitude of about 49 feet, and landed his plane in 75 seconds. If we consider the time consumed

in accelerating and decelerating the plane over that short distance, it can be perceived that he probably reached an extremely high velocity. The craft was a combination glider and small monoplane. It had an abruptly cut-off body, which terminated in a magazine containing spaces for sixteen rockets, each 18 inches long and 3 inches in diameter. There were two steering fins attached behind the wings, which had a spread of 30 feet. The track was 50 feet long. By the aid of three rockets, the plane, which weighed 500 pounds fully loaded, was shot into the air. These rockets burned for exactly two seconds each. The speed along the running track was about 85 miles per hour. The speed in midair was controlled by the intervals at which additional rockets were fired. Opel stated later that his flight was terminated abruptly within the confines of the Frankfort airdrome because the police refused to allow him to go farther. Because of the difficulties of making a turn at that high speed, and with a strong wind blowing, he had to make a premature landing in which the plane was wrecked.

Opel believes, as does Professor Goddard, that the future of rocket flying lies with the liquid propellants. He claims to have invented a liquid which will give three times the power of the powdered fuel that he usd in the flight on September 30. Opel plans in the near future to make a flight across the English Channel in a rocket plane of his own devising.

The work of Max Valier has been chiefly along the lines of the rocket motor car. In a successful recent test he drove his car at a speed of 120 miles an hour, which he attained within eight seconds after his start. In this experiment, Valier also used a powder; but in a later experiment on September 30 he used a liquefied gas. In this test he developed a speed of only 40 miles an hour, which, he stated, was all he expected at the time. He is frankly skeptical, however, of the application of the rocket principles to planes: "A relatively high exhaust speed can be obtained from the explosion of hydrogen with oxygen, or similar fluid propellants of high kinetic power, but these are expensive besides being heavy; while the process of their combustion has been insufficiently investigated."

The experiments of Professor Oberth have been more or less shrouded in mystery; for Oberth is reluctant to divulge much until he is practically ready for an imposing test. His experiments have been financed by the U F A Film Company of Germany, which has been taking a great interest in the problem of interplanetary travel. Professor Oberth also disclaims any immediate intention of flying to the moon; but he believes that he can develop a vehicle that will be able to travel from Europe to New York in thirty minutes. He calls this his "geographic rocket." Oberth believes it possible to build a space-rocket ship, 136 feet in length, which would travel at the rate of about seven miles per second, and discharge its burnt-out rocket in flying; so that the space-ship would become considerably smaller on the way, and thus be enabled to land on the moon. This method is pictured very vividly in Gail's "The Shot Into Infinity," which was based on the technical knowledge of Oberth, Goddard and Opel.

At the present time, Oberth is planning a test of his present rocket somewhere on the North Sea. He is also using a liquid fuel in the form of liquid oxygen, which he intends to combine with benzine, alcohol and other combustibles. He hopes to attain in his initial test an altitude of 31 miles, and even to be able to determine the spot the rocket will touch on its return to earth; this will be by means of an automatic steering device in the rocket. There are in the present rocket four shafts of galvanized carbon, which, when brought into contact with the liquid, are gradually consumed; thus generating a gas that is discharged through the rear of the rocket at a speed of 1,500 meters (about 5,000 feet) a second, and forcing the rocket forward. The rocket, when fully loaded, will weigh about 150 pounds.

Upper right shows Professor R. H. Goddard, American expert on rockets, examining in his laboratory the rocket that he states can give a speed of ejected gases of 8,000 feet per second. On the lower right is shown the rocket in question. On the lower left is shown the Goddard rocket which made a successful test flight near Worcester, Mass., on July 17, 1929. The rocket Professor Goddard is holding uses smokeless powdered fuel while the one that made the July 17th flight used a liquid propellant.
(Times Wide World Photos)

It can easily be seen from this brief survey of what is being done in the field of rocket propulsion that there is an inevitability of the scientists accomplishing what they have attempted. Popular interest is now being awakened, and it is likely that any further serious attempts at rocket flying will not lack for funds. The criticism and ridicule that attended such ideas ten years ago have now completely disappeared, and we find editorials and cartoons in the newspapers openly accepting the future of space flying. Serious scientists state that in this question

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The Time Oscillator

by Henry F. Kirkham

Illustration by Paul

I saw a vast concourse of quaintly-dressed people. They were standing before a mighty revolving globe that scintillated with all the colors of the rainbow. Now and again they swayed back and forth.

THE TIME OSCILLATOR

ALTHOUGH he was a neighbor of mine, I had no more than a speaking ecquaintance with him. I knew him only as a very eccentric individual given, principally, to burning the midnight oil and to conducting endless experiments in a sort of rude laboratory building he had constructed at the rear of his home. Otherwise he was a very queer recluse who tended, occasionally, a small garever left his premises.

It was this latter employment that served to introduce us. For, while I am a practicing physician, amateur gardening is a pet hobby of mine and some over-the-fence conversations, eventually, led to a closer understanding.

HENRY W. NEWMAN

From these rare visits, I finally gleaned something of the history of Mr. Brown, my eccentric neighbor. It seems that the gentleman in question had once occupied a position of no small repute in the professional world—not only along the line of theory but also in many practical branches of science. But, even in those days, he had been noted as an independent investigator with such a radical set of ideas that he shocked his professional associates and caused them, ultimately, to read him out of fellowship.

The principal reason for this action lay in the proposition he had set up regarding the nature and possibilities of the fourth dimension. His contention that time, "the measure of duration," is not divided arbitrarily into the present, past and future but may, under proper conditions, be accelerated or retarded, was so radical a departure from known facts as to excite ridicule, not to mention derision, from his colleagues. What they demanded was proof and at that period, Brown was not prepared to give it.

Somewhat embittered at this cold reception of his theory, Brown had retired from active public work to his present retreat and was now engaged in a series of experiments by which he hoped to confound his enemies. His success I, of course, had no means of gauging, and, in fact, I might have remained in ignorance indefinitely, but for an accident.

One night, when preparing to retire, I chanced to glance toward my neighbor's laboratory. There I noticed a small blaze leaping from the roof. I quickly hastened to the place and as quickly extinguished the flames with a handy extinguisher. In the course of operating the thing, my finger was jammed and a blue mark came that never disappeared. This may seem an unimportant point; but as you will see later it is very significant. I then forced open the door of the building and entered a smoke-filled room, where I perceived Brown stretched out prone on the floor.

Dragging him outside, I summoned a passer-by and with his assistance carried the unconscious man into his home. Here, a hasty examination told my professional eye that Brown was suffering nothing worse from his experiences than a slight shock and a bit too much smoke, and would soon recover.

This diagnosis was quickly verified. My patient sat up muttering, in a dazed sort of way, "It was so wonderful—so wonderful!" This exclamation he repeated several times before he regained his composure. He then, however, elapsed into his habitual silence, nor would he volunteer any information regarding the cause of the accident. He dismissed me with an expression of gratitude, adding:

"I cannot explain matters now. It was all so thrilling, so tremendous an adventure that I require time for reflection. I promise you, though, that you shall hear the most amazing story that was ever told——on some future day."

With this queer assurance I was forced to be content. But I could not return to my interrupted rest. My brief view of the interior of the laboratory, together with Brown's strange words, had aroused my imagination to the *n*th degree.

I remember it as a sort of miniature "crystal palace," within. Great convex and concave mirrors hung upon the walls, giving a most uncanny appearance to the room, while in the center of the floor sat a large block of pure crystal, above which glowed an endless number of lights.

What could be the use of all this bizarre arrangement, I could in no wise fathom. I finally reached the conclusion that Brown was somewhat demented, and so dismissed the enigma from my mind.

Imagine my surprise,

STORIES of traveling in time are always exceedingly interesting reading, mainly for the reason that the feat has not yet been accomplished; though no one can say that it cannot be done in the future, when we have reached a much higher plane of scientific achievement. Traveling in time, either forward or backward, may well become a possibility.

In the present story, our new author has presented us with a rattling good story built on these premises and, incidentally, has given us a great deal of food for thought.

The story raises again a much-discussed problem, that has perplexed all those who have thought deeply on the subject. If we assume that one can travel back in time, is it possible for such a time-traveler to mix into the affairs of the period and with the people existing at that time?

Elsewhere in the text of this story we have gone more fully into this. The story will give you excellent entertainment and provide you with enough thought-provoking questions for a long time to come.

therefore, when several weeks later, I received a note from that gentleman requesting the pleasure of my company at his home the following night. Should I accept? Men with his type of dementia have been known to develop dangerous forms of insanity. This thought I speedily put aside as too fantastic. Here was a splendid chance to study Brown at first hand and, so, I decided to comply with his polite invitation.

A Challenge

I WAS cordially received by Brown in his finely-appointed study. Wine and cigars were on the table and my host performed the honors in a way that gave no hint of mental derangement.

Presently he said: "Of course I owe you some explanation for the service you rendered me some time ago. But to make myself clear, I must first enter upon a more detailed outline of my experiments. To state, offhand, that you found me, then, intoxicated by a journey of a thousand years into the future, would be simply to invite your belief into my insanity. Oh yes, I know how the world regards me and my 'folly!' But what I have just stated is true, nevertheless, and that is why I must approach the subject in a different manner."

I nodded my head in agreement.

"To begin at the beginning," he resumed: "I have made a life study of the relation of time to matter. And, after all, the problem is not so complex as many suppose. It consists, largely, in viewing time, not as a simple yard-stick for measuring the passage of the visible universe; not as some abstract quality having a definite, fixed value; but rather as a very real state of existence itself. A fourth dimension, in short, that is as solid, as substantial, as true as the other three.

"In theory, it is possible to prove this assertion; in demonstration, very difficult. The human mind, heretofore, has not trained itself to the larger outlook. We have advanced in mental development only to a degree where we can comprehend and act within the three known dimensions. Scientists accept as the gospel truth that this viewpoint is the sum total of possibilities. They do not reason that all truth is relative, a matter simple of proof; that there is no fixed value, no point of absolute verity. Rather, like blind men, they do not see the light, and, therefore, contend that there is no light. Length, breadth, depth, these are obvious facts; but time, which embraces all, they reject as a mere incident, as merely the measure of events, instead of an expression of matter as vital as any other.

"In the infinite realms of time there are, also, an infinite number of lines, angles without end. Cubes within cubes, like the leaves of a book, all forming the whole, yet each reflecting a separate plane of existence.

"It has been my mission to delve within the pages of this inspired volume. After many failures, I have at last succeeded, and it has been a most wonderful experience. I can follow the earth-line backward or forward. I can follow any quantity of divergent lines, and behold places and people that have no parallel in human understanding. Therein, of course, lies danger; and it was upon one of these untried paths that I well-nigh lost my bearings and my life. Luckily for me, the apparatus which opens the gate of these intricate mazes failed to function; and so I came back to the earth-plane in a shocked, but otherwise sound condition."

I had listened, carefully, to this strange recital. Now, however, I interposed my first objection.

"Mr. Brown," said I: "You will not be offended, I trust, if the whole project appears to me as a physician to be one of those common hallucinations due to excessive study and overwork. If you were a patient of mine, I should certainly prescribe a rest and other fields of interest for a while."

He did not seem to mind my remarks in the least; perhaps he had met the same line of objections in the past. In fact, he smiled broadly.

"Another doubting Thomas," he replied: "See here, you do not deny the positive fact of time—do you? As a matter of argument, time is the most universal, the most insistent of all phenomena. It enters absolutely into every manifestation of life. Inertia reckons time; motion takes time. Even so fleet a messenger as thought is recorded by time. Nothing escapes its omnipotent presence. It is, in truth, the Alpha and the Omega of all things. Therefore why so strange that it should encompass all things?

"But I have better proof than mere words. If you will take the risk, I will take you on a voyage of discovery that will, forever, silence your carping spirit. Do you dare?"

This bold challenge left me in a rare predicament. I could no longer interpose the plea of pathology when the very subject, himself, offered to make me the sole judge of the results. Still I hesitated. I am of a turn of mind not given, overmuch, to experiments. I prefer to tread the comfortable paths of the proven. Yet here was an unexcelled opportunity to leave the beaten trails that was so unique as to be beyond belief.

Brown was still smiling. It spurred me on to resolution.

"I accept the dare," said I: "If there is any truth in your statements, then, the demonstration ought to be a wonder."

He arose abruptly and led me into the laboratory. Switching on the lights, he seated me, in a slightly reclining position, upon the crystal block, previously mentioned.

"I cannot go, at the present moment, into an extended account of the workings of the machine," said he: "In a general way, however, the results are obtained by a powerful combination of rays, mirrors, and atomic vibrations, which serves to distort the image of the real and so upset the sense of stability as to produce a state of mind wherein perception of the fourth dimension becomes a reality."

"And, strange to say, no more is required than to act within its scope—absolutely all! It is simply a matter of bringing the mind into harmony with the

plane of time, to be able to move and act within its dimension. Take the hypothetical case of a race of men, so deficient in comprehension as to recognize only one or two dimensions. To them, the cube would be completely outside their perceptions, just as truly as the fourth dimension is to the human race. But the cube does, in fact, exist and mankind comprehends and acts within its boundaries. So the mere knowledge of the fuller attributes of time is sufficient to enable one to move freely in its sphere.

"Moreover, action within time, is all relative. It may seem long, but be the work of an instant; short, yet occupy endless cycles. Time, in its exact meaning, is not measured by hours but by eternity. 'A thousand years is as a day in the sight of the Lord.' Do you realize the true significance of those holy words?"

CHAPTER II

A Journey Into Time

As a matter of fact, I had begun to realize all too well. What if the second postulate should prove to be the case, and leave me, so to speak, suspended between here and eternity—what then? I had come to wish that I was out of the whole ridiculous situation but, in the face of Brown's still-lingering smile, I could, in no wise, find a heart to do it. Rather I calmly said: "Well, let's go, professor."

"Go where?" said he.

I had been reading, the previous evening, a charming story of the French revolution. "I would like a close-up view of the guillotine," I replied: "As a physician, it has for me a peculiar fascination; it was so effective a surgeon."

He made no further comment but, after consulting a table of schedules, set the dial on an electric switch controlled by a large clock. I glanced at this clock. It was exactly nine p.m.

Suddenly, the clock became blurred. The figure of Brown, at the switch, took on a queer sort of elongated outline. All that I could see with any degree of clearness were the mirrors on the walls and, even these appeared to be revolving furiously.

Utmost confusion prevailed within my mind. I seemed to be slipping down a steep incline between an endless series of parallel lines. My perceptions of distance and of motion underwent a curious effect of expansion as though I stood upon a point remote from the earth and was a lone spectator of all that had gone before. An exhilaration of spirit possessed me and I was filled with an intense desire to shout aloud. Then my feelings changed. In a strange way, I had a feeling of limitation, as if I were on the outer edge of a vast wheel revolving towards some definite goal. As though I were reading history backwards and were, in some manner, a party to its making. I had, also, some dim memory of the multitude of things that might have been; things that had played a minor part in the divine plan and had gone again like celestial scaffolding that is torn down.

How long these vague sensations lasted, I have no means of knowing for, as abruptly as they began, they also ended. As plain as day, as real as life, I stood within a cold, dark dungeon. I seemed to move freely therein and yet I knew, in some strange fashion, that I was not a part thereof; bars and bolts had no binding effect upon my movements; that I was invisible to mere human eyes.

Three men, of aristocratic appearance, though dressed shabbily in tattered remains of former finery, were grouped around a small table, conversing earnestly. A fourth man, of younger aspect but of the same noble type, stood apart watching the faint light that fell from the high barred windows.

The eldest of the group at the table was speaking.

"Monsieur Le Comte," said he, "it certainly does seem the refinement of cruelty these ruffians have devised. Not content with decreeing my own death, they have, now, arrested my son in the name of 'Liberty.' How, in God's name, could he be involved in treason? Since the death of my wife, he has spent all his time in England completing his education; and he returned only when he learned of my arrest, to work for my release by all legal means. He is so young and manly, too; the only one left to continue my line. For myself, I do not care overmuch, but for him"—the speaker paused to wipe away a tear.

The one addressed as Le Comte placed his hand, affectionately, upon the shoulder of the elder.

"You know how I feel," he said: "How close the ties between us. How we hoped to unite our houses when your son should marry Eloise. But we are in the hands of God, my friend. Let us hope for the best. There is one blessing in all this wretchedness. Eloise is now safe away, thanks to our good friend here, DeCoven. I have sent her to a secure retreat by means of the trusted servants whom he furnished."

The man referred to as DeCoven had not spoken, as yet. He appeared to be in the full confidence of his companions. I noticed, however, by my quickened sense of observation, that he darted a malevolent glance towards the young man. He now turned towards the other two:

"You should have more faith in the influence I possess in high quarters. I have but recently made known the offer of gold to them. I have good reason to believe that it will soon be effective. Just as I secured the pass that enabled Monsieur Le Comte's daughter to escape, so I am sure that the interest I have with the dictator will present obtain our pardon also."

These bold words appeared to uplift the drooping spirits of the prisoners, for they all sat down to the meager board in a much more cheerful frame of mind.

Alas, for the vain philosophy of life! At this very moment, the iron doors swung open and admitted a file of nondescript soldiers headed by an equally nondescript officer. The four men arose with a look of terror in their faces.

"Edward Le Blanc and Citizen De Coven, step

forward," demanded the officer: "I have here an order signed by the Committee of Public Safety, for your immediate execution."

At these terrible words, father and son fell into each other's arms in a silent agony of fear. De Coven blanched a deadly white.

"There must be some mistake," he shouted: "Robespierre is my protector!"

"Explain that to him, then," said the officer. "I have the proper papers signed by the president himself. I must do my duty."

And, forthwith, despite the violent resistance of De Coven, the two were bound and roughly hustled out of the prison. I caught but one fleeting glimpse of those left behind as I, too, followed the doomed pair to their end. Poor father, poor friend—fate is no respecter of age or position.

Into a high cart they hastily tumbled the prisoners, and the grim procession to the place of execution began. The line ran over an uneven, cobblestone-paved thoroughfare, amid a mob of jeering people; and so on, to the great square in which stood the dread guillotine. Upon this rude structure had died many distinguished figures, victims to the real or fancied wrongs of the new republic.

Here, also, came our two prisoners: Edward, reconciled to his fate and with the serene look of one who has made his peace with God; De Coven, chattering and protesting in an agony of fear.

Just as we arrived there drew up also another cart containing only one victim—a young and beautiful girl. Edward, when he saw her, gave voice to his pent-up emotions. Surprise, love, impotent agony, chased across his noble countenance in quick succession. He was not, evidently, prepared for this fearful blow of fate. He had every reason to believe that she, at least, was safely out of this inferno.

"Eloise," he cried, "Eloise, my beloved, how came you here?"

Eloise was quite as deeply moved as was Edward. The shock of this fateful meeting was truly as great to her as to him. Neither of them had known of the other's misfortune until they met thus, for the first time in months. What a love tryst was this! The same death that was to separate them on earth would also unite them once more in eternity.

All that Eloise could say was, "I have been betrayed. I was led, not to a place of freedom, but to prison. Oh, my adored one, let us lift up our eyes to heaven. There is no help left on earth!"

She gave but one, pitiful, despairing glance at Edward ere they led her to the plank. Upon Edward's face settled a look of exalted love. He knew her then, at that supreme moment, for the great soul she truly was.

Convinced

I TURNED towards De Coven and read his mind as clearly as an open book. Disappointed in his own hopes for the affection of Eloise, he had betrayed her to the authorities, in exchange for his own liberty—and had been outwitted in the end. A truly poetic justice here! The same moment that gave him his revenge would also bring him before the bar of judgment to answer for his crimes.

Although the guillotine in action was what I had come expressly two hundred years to see, still I could not bring myself to witness the deaths of these two young aristocrats. Rather, I chose to watch the antics of the eager crowd of spectators. Here was a drama with reverse settings; instead of playing the usual rôle of suffering actors, they now formed the audience to enjoy the spectacle of their former masters going through those parts, indifferently well.

They formed a ring around the blood-stained machine and kept up a constant fire of invectives, jests, and curses. For the most part, they were composed of the scum of the city. My professional eye noted the criminal, the diseased, the morbid types with, here and there, the face of a dreamer.

"Cheer up, aristocrat," shouted one burly ruffian: "The ax is a fine barber!"

"Now, my beauty, in a moment you will have a whiter complexion than the flour your father stole from me," cried another.

"Death to the traitors," roared the multitude. "Death—!"

But, at this very moment, with a confused murmur of sounds still ringing in my ears, the whole dramatic picture faded slowly away. I opened my eyes—not upon the place of the guillotine—but in the peaceful laboratory of Mr. Brown. I looked at the clock. It was exactly 9.01 p.m.

I rubbed my eyes in amazement. Could it be possible that all the successive scenes, the varied characters, the intense play of emotions, I had just witnessed, were the work of one minute of time? Even if the entire performance were but a dream, the figment of imagination, the result of hypnotic conditions, it seemed impossible that it could have been enacted in so brief a period. Yet the clock could not lie; one minute told the story.

Brown advanced to my side. "Well," said he, with a mocking laugh; "are you now satisfied that I am not altogether in a state of hallucination? But, pardon me, I do not mean to be rude. Let me hear of your experiences on the back trail of the fourth dimension. Also, the conclusions you draw therefrom."

I related them briefly. Somewhere, in the back of my conscious mind, I seemed to have a feeling that I myself was in some manner intimately connected with the scene; as though I had, in some former cycle of existence, been a personal actor in the drama. Perhaps, after all, this was a true explanation. I so stated my belief to Brown.

He appeared slightly peeved: "We will not let any theory intrude here. No hypothesis of reincarnation, no work of the subconscious, will fit this case. You have in reality, in very person, traveled back along the path of time and been an actual reader of its recorded history. The very characters were facts, not fiction. What you witnessed was an episode that happened in all reality and was recorded, to last forever,

upon the screen of time. Whether or not some subtle chord of memory drew you to an incident of your previous life, I do not pretend to know. But do not, I beg of you, confuse this demonstration with any mere illusion of the mind. To prove this assertion I will, if you feel sufficiently able, reverse the process and place you on the path of the future."

As a matter of fact, I was no wise exhausted by the recent experiment. Rather, I felt refreshed, as though the powerful rays shining from above, had exerted a tonic effect upon my physical being. Accordingly, I indicated my willingness to embark on the new venture.

Brown, thereupon, returned to the dial of the machine and placed his hand on the switch.

"Goodby, friend," said he: "If I mistake not, you will return from this excursion a wiser but a sadder mortal."

Again the vision of revolving mirrors, the blurred lights, the sensation of movement through space, assailed me, but with this difference. I seemed to be gliding upwards, instead of downwards as before, and the lines of limitation were of the nature of a spiral rather than parallel lines. Also, I had a freer outlook without the sense of a definite goal. In fact, I had a very real feeling of freedom, of expansion, of a fullness of being. I seemed to float like a thistledown blown by the wind, touching only the high spots here and there.

I have a vivid impression of pausing, for a moment, before a great tower that reached to the very clouds and flashed with a multitude of brilliant lights; the whole vast structure seemed formed of solid glass. What the purpose of this giant edifice might be, I can not venture a guess; but I do know that it left a lasting record upon my memory.

Another fleeting vision I had, of a great airship sailing swiftly and grandly through the blue sky. It had the general appearance of a splendid ocean liner and was quite as finely appointed.

Still another scene I caught of a vast concourse of queerly-dressed people. These were standing before a mighty revolving globe that scintillated with all the colors of the rainbow. Now and again they swayed back and forth as though in worship.

All these detached views, and many others, had some of the effect of a motion-picture newsreel. They flashed out vivid and distinct, though very real to me; and then, as quickly, faded out again.

Upward and upward, I rushed at a speed that appeared prodigious for a time that seemed to be endless; ever upward, through a never-ending spiral, until I grew fairly dizzy with the effort.

Suddenly, with an abrupt shock, I came to rest. That shock, I soon realized, arose from contact with the seat of an elevator that shot upward with amazing speed. Also, I saw that by my side sat an old man of very patriarchal appearance; dressed in long flowing robes of pure white, his noble head encased in a purple turban, a benign smile upon his face. He greeted me.

"Another messenger from the earth-plane," said he. "I welcome you to these realms of the future. We receive but few from the earth-line; although a multitude come and go over the maze of lines that cross, like a spider web the infinite lanes of space. I knew of your coming, oh mortal, by ways you cannot comprehend. I am here to act as your monitor while you remain."

He bent over and kissed my forehead. "At this point we alight," said he, and forthwith conducted me out upon an elevated platform.

I gazed over a landscape so wonderful that words will scarcely suffice to describe. An immense city stretching as far as the eye could see, resplendent with Gothic spires and shining golden domes. Each separate building gleamed with a soft iridescent color that had all the beauty of a summer rainbow, so symmetrically arranged as to give the effect of perfect harmony.

The Man of the Future

I ONCE saw a splendid painting, entitled "The City of Heaven"; here was such a picture made real. I looked and looked as one who is in a trance. I could not voluntarily withdraw my eyes from this enchanted land; for here, plainly, had man achieved all that the most inspired artist, or the most enraptured poet, could have dreamed.

My guide, however, drew me gently aside and, placing me in a small closed car, pressed a button. Almost in an instant we arrived at the entrance of one of these exquisite habitations; thence, up a short flight of magnificent stairs we passed into the rest and quiet of a delightful room. The walls of this room were of some translucent material that admitted a subdued light and, also, served to illuminate designs of flowers, and other works of art embedded in the walls, so that they stood out in a most realistic manner.

My monitor motioned me to a comfortable chair and took his station beside me.

"Now," said he, "you are, no doubt, anxious to know what all this means, how I came to meet and recognize you, and something of the significance of this far journey of yours.

"In the first place, we of this blessed land are those of the past who have achieved the promise of the future. We have entered upon the fourth dimension where there exist no limitations such as your fettered race endures. To us, the boundaries of matter have ceased to be. We move freely, live gloriously, enjoy life to the utmost. Years are of no account, sickness is unknown, the elements torment us not at all. We devote ourselves wholly to the pursuit of knowledge. In short, we are in the very Utopia of which you mortals dream.

"By arts, unknown to you, the vast scroll of the past unfolds for us. We read history as it actually is without distortion or additions. By this art did I know of your coming—See—" He pressed a button and the wall towards which I faced flashed instantly into a living picture.

On this screen, I saw myself reclining on the crystal block within the laboratory of Mr. Brown. I saw myself embarking upon this adventure. I again reviewed some of the same fleeting pictures along the path I had previously witnessed—only this time more clear and perfect.

Also, in a larger way, I saw the struggle of the human race towards the higher life; battles, famine, peace, prosperity, rural landscapes, metropolitan settings, nations arising and declining, the sordid things of life, its petty concerns, its small and narrow outlooks, its selfish ambitions. Many fine endeavors, too, I beheld; and the great souls who painfully led the masses forward. All these and a host of others crowded this wonderful panorama of human advancement.

Upon the screen I saw many of the inhabitants of the city. Beautiful women and splendid men they were too. No hint of petty ambitions, no disappointed passions marred their noble features. All, alike, bore the impress of a serene and perfect contentment. They had evidently arrived at the summit of mental and spiritual perfection. They were the blessed children of promise.

How mean and useless the life I knew seemed to be in comparison. Oh, that I might become such as they! Oh, might I remain forever in this glorious abode! I turned towards my guide to voice this ardent prayer. I looked once more into the smiling face of Brown.

"Mr. Brown," I remarked, after I had recovered my earthly equilibrium, "you are truly a prophet. I am, indeed, wiser by a thousand years and sadder by all the longings of one who has had a glimpse of paradise and been denied admission. To what I am to attribute this experience, I must confess I do not know. Certainly it did not arise from anything within my subconscious mind. I have never, in my wildest moments, even dreamed of the amazing vision I have just beheld."

"So," laughed Brown: "The skeptic has become the enthusiast. All the better then, for you will make an ideal subject for the final experiment I desire you to take. All of your former voyages, within the fourth dimension, have been along the common attributes of time. The past, up to a certain point, is but the recorded history of mankind; the future, the foreshadowed events of destiny. But time has an infinite number of angles not so readily understood. It was while exploring one of these mystic lines that I wellnigh lost my life. I feel that it was for the lack of a trained second person to watch the machine, rather than from any failure of the method, that the disaster resulted. Hence, I ask you to act as the investigator under my direction. Do you feel willing?"

I was more than inclined, I was almost anxious. Here was one further opportunity to completely remove any lingering doubt and at the same time enjoy, even though an illusion, another novel adventure.

"What might be the nature of the trip, flight, or what-not?" I inquired?

"It is a very curious affair with, absolutely, no basis of earthly comparison," answered Brown: "It is akin to sensation produced by color and sound, as though one could give these two attributes form and life. More, indeed, as though one had taken certain drugs, but without the physical reaction. Before we proceed further, I will take your pulse and temperature so that we may be satisfied on that point."

He did so and found them normal.

For the final experiment, he made some different arrangements in the apparatus. He changed the mirrors from a vertical to a horizontal position and placed a row of huge magnets, in a geometric circle, around the crystal block. Also, this time, he did not set the dial but, instead, stood watch in hand as he turned the control.

I became immediately conscious of walking along a vast hollow cube, or rather a series of hollow cubes that seemed to extend to the very center of vision. A box-like effect such as one is taught to draw in school, but with this startling difference, that each plane surface multiplied itself into an endless number of planes; each right angle into an infinite number of right angles; so that I had the impression of a bewildering maze of angles and planes.

I, also, became possessed of a sense of accelerated motion. The six common directions of up and down, backward and forward, right and left, enlarged to an alarming extent. I felt entirely equal to a sort of double movement in opposite directions at the same time. With me, parallel lines did meet, the straight line was not necessarily the shortest, and the point was not always the starting point of demonstration. In a word, all the usual mathematical formulas were in the discard; I lived, for the moment, in a superworld where mundane rules no longer applied.

The realization of this condition brought on a delicious sense of freedom, of uplifted spirits, of casting off human fetters, that filled me with intense happiness. I was monarch of all I surveyed.

I moved, joyfully along one avenue from which flowed a beam of purple light; a living, moving, laughing light, that glowed in undulating waves, entwining itself about me like a circle of wonderful flowers, a flame that expressed not merely light but sound and color, also.

From still another angle of this mystic maze came an endless pulse of melody, like the minor key of some great celestial organ. A strange perfume mingled with the sound, intoxicating as a rare day in June.

From countless other angles came crowding a vast concord of utmost sensations so exquisite as to overpower me. Every sense quivered to these tempestuous raptures.

I faltered. Some inner voice gave warning. I could not long endure this surge of exalted emotions—and live. I was not sufficiently prepared. I was a neophyte upon the path of the masters. I faltered. I awoke.

Brown still held the watch. "Five minutes," said he.

He felt my pulse. "Normal," he reckoned.

"In short," he concluded, "a very successful excursion into the domain of Time, the Conqueror."

CHAPTER III

Back to Atlantis

AFTER my return from those amazing excursions into the fourth dimension, I had no dealings with Mr. Brown for several months. I knew, however, from the activity going on in his laboratory that he was busily engaged in something new. Therefore I was in no way surprised to receive, one day, an invitation to call at his home, prepared to spend some time in co-operating with him upon an interesting experiment. The nature of the experiment was not revealed in the note, but I was requested to bring with me my medical kit.

By this time I was an active believer in the genius of Brown, and no longer scoffed at the possibility of his achievements or doubted his sanity of mind. In fact, I would have been delighted to have heralded to the world the wonder and value of them but for the positive interdiction of the inventor, himself. Said he: "The world is not yet ready for my message. It would still reject my claims. I must have more certain, more tangible proof, before I lay my results before the public—if I ever do!"

As on the first visit, I was received cordially and Brown plunged at once into the object of the invitation.

"We are now about to embark upon a voyage into space," said he, "that will test our ingenuity and our physical resources to the utmost. I am going to undertake the transportation of ourselves and our equipment to a distant land, a land so remote and so shadowy that it is lost in the midst of legendary history—no less than that far famed country of Atlantis! Here I hope to witness in person what has heretofore been only recorded in fancy and, if possible, to bring back with us some living, actual evidence. In short, like Columbus, I expect to return with some visible object that even the most skeptically minded can not deny.

"To this end, I have devised some special equipment. Come, I will show it to you." He led me into his laboratory. It was completely rearranged; in the center of the room, in place of the previous crystal block, stood a one-roomed house that had the outward appearance of solid glass. Within, I was shown a comfortable apartment equipped with all the necessary furniture and provisions for an extended stay. Also, a complete outfit of arms, cameras, and other articles whose exact nature I did not understand.

Mr. Brown proceeded to make matters clearer to me. He indicated the glass house: "Here will be our quarters for an uncertain period. It will be our key to the fourth dimension. While we remain within its portals, we will be invisible and secure. If we venture forth from this shelter, however, we will run great risks the nature of which I cannot now surmise. I have engaged a trained assistant to run the machine at the laboratory, so that we will be safe on that score. As to the rest, we must leave that in the hands of fate. With this information, do you feel disposed to venture with me?"

"Mr. Brown," I answered, "you can count on me to the last. I have the utmost confidence in your judgment."

He now indicated to me a small table, painted white in the center and containing a number of dials. He stated that this device acted as a sort of camera-obscura and would enable us to view the outside topography from time to time. The outlook, however, would be brief; for the laboratory control was set to drive us inexorably to our goal.

Brown glanced at his watch. "The moment is at hand, Doctor," he said. He arose to close the door.

I must confess that I looked forth at my workaday world, at that instant, with much yearning and wondered what sort of an ass I was to thus hazard my life on such a venture.

While I deliberated on this problem, Brown fastened, securely, the door of the house and, returning to the table, stood watching the dials intently.

"When shall we start?" I enquired.

"Start!" he replied: "Indeed, we are now a thousand years along the backward trail!"

Brown laughed loudly at my air of discomfort. "As I have before explained," he remarked, "time is only a relative term. It means literally nothing. Minutes, hours, days, years, are all arbitrary creations of mankind to register the passage of events. Under different conditions mankind would use other measures of values. For example, upon a planet like Jupiter whose orbit around the sun requires years twelve times as long as ours, the inhabitants would, undoubtedly, use a basic division twelve times as long, although they might designate it by the same term. Somewhere in space is a universe so vast that events as measured by our standard would make a hundred years but the equivalent of a single second of ours—or, perhaps, the reverse. The mind of the ordinary man does not seem to be able to realize that all things, great or small, are but comparative. There is, in truth, no fixed point from which one can compute absolutely, the duration, motion, or magnitude of the visible universe. For the sake of convenience, we have assumed certain things to be facts, until usage has come to make us believe them to be absolute verities.

"What is a yard, a pound, a gallon? All arbitrary standards. Your text books start out with the commonplace assertion: 'Let X be a point,' when, as a matter of fact, there is no such point at all. East, West, North, South—all are matters of the geographer's imagination, and a limited one at that. And what better terms can you expect while men of science flounder around like a fish out of water? They understand only three dimensions of space, when dimensions without number embrace the universe and angles in myriad lines offer themselves for our delight.

"We are upon one of those infinite lines now. I will give you a view of its possibilities."

He shut off the lights within the shelter; at once, the white center of the table became an animated screen.

Slowly across the circle moved a ship rowed by galley slaves, while closely following came a larger vessel

bearing the insignia of the Roman Empire. Presently this Roman ship overtook the smaller one and, dashing alongside, sent over a boarding party. Then began one of those sanguinary struggles that have always marked the annals of the sea. I could plainly observe the struggling figures—nay, almost hear their battle cries, so vivid was the scene enacted. I took particular notice of one giant warrior clothed in skins, with a horned helmet upon his shaggy head, swinging a keen ax. Here was evidently a raiding party of Norsemen brought to bay by the power of Rome.

The Journey's End

I GAZED in breathless fascination as the conflict hung in the balance. Outnumbered, but displaying that desperate courage for which these ancient Vikings were famous, time and time again the Norsemen repelled the onslaught of their foemen. However, in the end, weight of numbers and discipline prevailed and my last view of the conflict showed the giant ringed about by enemies. He seemed about to fall. No, he was striking out again. Then, with a supreme effort, he caught one of his adversaries in his brawny arms and, springing to the rail, with a last defiant gesture he plunged himself and his foeman into a watery grave!

Brown flashed on the interior lights. "A close-up of history," he said, calmly, "and the more interesting because true. One of those unwritten incidents of a far period that no one remembers now. One of an innumerable series of events, that are recorded only in the book of time. What a field for the student of history when the means we are now using becomes the common property of mankind. Think of the possibilities of being able to study, with the utmost clearness, with perfect attention to detail, and in very person, moreover, these unrecorded episodes of the past.

"Now, let us see what this second period may have to offer. It is old enough, to be sure; about 2000 years B. C."

This time I saw what I should judge to be a hunting party amid the splendors of ancient Babylon. A young and handsome man sat within a golden chariot drawn by prancing steeds. He was clad in a short tunic and held a powerful bow strung for action. He scanned impatiently the tall grass that lined the roadway, watching the slaves that beat the brush on either side.

Presently, from one clump of brush, broke a magnificent lion. Striking down one of the unfortunate slaves, it stood upon the fallen body and roared defiance. The young man in the chariot arose and, in leisurely manner, launched an arrow at the lion. His aim was faulty, however, and served but to infuriate the beast. With one awful roar it charged straight through the cringing slaves towards the careless hunter.

I do not know the sequel of this exciting drama, nor ever will, for the scene faded abruptly from the screen. But it was plainly a vision of those days when lion-hunting was a kingly sport and human life was held but cheaply.

Still another picture was reflected upon the screen—when and where it existed in reality, I cannot tell. It set forth a wonderful tropical landscape under a glorious southern moon. I remember a vision of waving palms fringing a silvery lagoon. Some queer night birds flitted across the open space, while a pair of native lovers sat upon the shining strand.

"The world is not so old after all," I remarked to Brown: "See, we have love's sweet song set to the music of romance, much the same as today."

"True," answered he: "Also some of the difficulties of love"—for at that very moment a monstrous crocodile emerged from the waters and came near to spoiling a perfect evening. It would have done so, too, except for the intervention of a cleverly-concealed trap which promptly ensnared the reptile amid a great splashing of water. Perhaps, the whole romantic setting was part of an artful plan for the undoing of Mr. Crocodile. Who can tell?

Brown laughed. "There is really nothing new under the sun," said he: "All the fundamental emotions were the same yesterday as now. Love, joy, sorrow, pride, have all been enacted a million times in the past and will be repeated again in the future. This fact will simplify the problem of our journey's end. We will undoubtedly find a civilization not so essen-

The Question of Time-Traveling

IN presenting this story to our readers, we do so with an idea of bringing on a discussion as to time-travelling in general. The question in brief is as follows:

Can a time-traveler, going back in time—whether ten years or ten million years—partake in the life of that time and mingle in with its people; or must he remain suspended in his own time-dimension, a spectator who merely looks on but is powerless to do more?

Interesting problems would seem to arise, of which only one need be mentioned: Suppose I can travel back into time, let me say 200 years; and I visit the homestead of my great great great grandfather, and am able to take part in the life of his time. I am thus enabled to shoot him, while he is still a young man and as yet unmarried. From this it will be noted that I could have prevented my own birth; because the line of propagation would have ceased right there. Consequently, it would seem that the idea of time-travelling into a past where the time-travellers can freely participate in activities of a former age, becomes an absurdity.

The editor wishes to receive letters from our readers on this point; the best of which will be published in a special section.

tially different from our own."

I glanced at the clock and was surprised to note that several hours had elapsed since the beginning of our voyage. I called Brown's attention to this condition, commenting on the vastly greater time consumed on the present occasion than in the previous experiments.

He pondered the question for a while: "That is one of the strange features of the fourth dimension that I do not myself understand. Perhaps it is a phenomenon analogous to sleep. We ordinarily repose dreamlessly the night through. Hours may have sped and seem but moments. Sometimes we dream and a whole cycle of action seem involved. Actually the dreams are measured in fractions of minutes.

"It all goes to prove that there is no fixed value in time. A million years or an instant, divided into infinity, will have a similar quotient. The clock registers what we think it does."

"If that is the case," I objected, "why the common agreement on the standard of time! We both accept this clock as our authority. So does everybody."

"Exactly," he interposed with some asperity: "We agree because we have all been taught to so agree. Everybody once agreed that the earth was flat; but that did not make it flat—or round either for that matter. It is the men who do not agree who blaze the path of advancement. How long, oh Lord, how long will men insist in following the beaten trails, blindly? How long will mankind cling in stupid worship before the shrine of accepted custom? You cannot lay your finger on a single so-called fact and say that this is the absolute truth. Why? Simply because you have no place on which to stand and judge the whole. In short, the finite mind cannot comprehend the infinite—and that is all there is to it!"

Brown was evidently becoming excited. To calm him, I ventured the remark, "Well, at any rate, let us be thankful that we are alive."

"Alive!" he fairly shouted: "How do you know so surely that we are alive? What if you should wake up from your satisfied sleep to find that all your supposed earthly existence is but the shadow of a dream, after all? What then? You do not know even what you are here for, from whence you came, whither you are going. You prance about like the merest puppets doing irrational things, and then you vanish like a candle that is snuffed. Fools that we are, we——"

Brown arose to his feet and pounded the table to emphasize his point, but immediately tumbled to the floor again, as did I and the majority of the furniture. With a sudden shock we had come to our journey's end!

In Atlantis

I GOT quickly to my feet, although badly shaken, and hastened to Brown's side. I found him unconscious, with all the outward evidence of a hard knock on the head. Here, then, came the first practical use for my medical kit and I was mighty glad of its handiness. A hasty examination of the injury showed no case of fracture, and this fact was an additional cause for joy. What on earth I could do for myself in the present uncanny situation, I was at an utter loss to conjecture. I doubt whether so unusual a problem as mine had ever confronted a mortal in all the history of mankind. Men have been lost before in mountains or on a desert isle, yet with some hope of final rescue. But I was, literally stranded on the shores of time and, without Brown's mysterious knowledge I was lost indeed.

Spurred on by these reflections, I worked on my companion to such effect that I had him soon restored to a normal condition.

"I owe you an apology," said he, rubbing his head somewhat ruthfully: "I got to discussing a pet theme of mine and, in consequence, failed to watch the operation of the machine as carefully as I should have done. I trust that no vital damage has been the result—No," he resumed, after a hasty examination, "nothing of moment has happened, or else we would have had an excellent opportunity to test the reality of life, as elaborated by you."

Brown then proceeded to adjust the camera-obscura and, by its aid, we took our first glimpse of the land we had come so far to view. A brief glance told us by what a narrow margin we had escaped total destruction. The house rested, in truth, upon the very edge of a vast chasm. A single yard more, and we would have plunged down a thousand feet to certain death.

On the other side of us ran a roaring mountain torrent which eventually poured, in a great cataract of water, over the edge of the chasm. This fact served to isolate us upon a natural plateau that was, at once, our danger and our security. It probably accounted for the lack of human habitation beside us; but gave us some uneasiness as how we were to get out of the predicament ourselves.

That there were plenty of human habitations in sight, however, was apparent upon further scrutiny. From afar appeared the buildings of a mighty city, while a smaller place nestled at the very base of the cliff. Although the scene was somewhat dimmed by the shade of approaching night, we could perceive many huge structures but no sign of more modern civilization.

"Evidently an age where art has preceded invention," concluded Brown: "So much the better for us. We will have something to show the natives that will astonish them. Tomorrow we will investigate more of the details. Let us now turn in, for I expect that another day will produce plenty of action."

"Will we not be discovered by the people hereabouts?" I inquired: "It seems to me that we are as conspicuous here as a fire on a hill."

"Not at all," we replied. "Have you forgotten that this house, and all it contains, is completely invisible? When we step outside, however, is another matter. Also how to get out of this *cul-de-sac is* going to give us a bad hour. It is no use, though, to cross bridges until you come to them. I for one, vote that we retire to rest. My head feels like two."

This statement at once excited my professional alarm: "I wish I had an X-Ray picture of your cranium, Mr. Brown; the superficial examination I recently made is not very satisfactory to me."

He immediately unlocked a cabinet and produced one of those newly invented contrivances that makes it possible to view the interior of the body at a glance. I quickly satisfied myself of the soundness of Brown's skull.

"I have a number of devices such as this," said he: "Devices that will astonish, not to say edify, natives of this blessed land or I am badly mistaken. That is one of the decided advantages of being in advance of an epoch rather than behind it."

We retired to rest but I must confess that I, for one, did not fall at once to sleep. The strangeness, the unprecedented situation in which I found myself, seemed more like a nightmare than an actuality. Think of being shifted backward ten thousand years or more! Think of standing in the very flesh amid events that are not even known accurately in a recorded history! Think of viewing a great city, teeming with life, that has utterly vanished from the face of the earth! No! it must be all an illusion. It could not be true. Yet my senses testified to its reality.

Moreover, the substantial breakfast which Brown served on the following morning, brushed away any lingering doubts. Also, the two suits of closely woven wire which he produced.

"Clothed thus," he explained, "woe to him who lays a violent hand upon our persons! We have but to push this button to transform ourselves into human dynamos. In addition, we will arm ourselves with automatics, a camera, and a pair of field glasses. Then, like crusaders of old, we will be prepared to take the city by storm."

He opened the door of our shelter and we sailed forth, the first civilized men who knowingly set foot upon that fabled land.

It was, indeed, a glorious picture that met our gaze. At the foot of our cliff ran a green and fertile valley stretching away to the far horizon. Several miles distant, the great city glittered in the sunlight. A city with many splendid buildings, one of which in particular, seemed to be a palace of authority. Closer, in descending terraces were the lesser abodes.

Here was certainly the home of a people high in the scale of advancement, somewhat after the fashion of the Incas of later days. We could not detect, however, any evidence of progress toward modern improvement save in the matter of the masonry of the great buildings—an art that has been typical of many primitive people. We took notice, also, of a body of soldiers drilling in an open space; they were armed only with swords and spears, but because of their numbers, formidable for all of that.

I voiced this judgment to Brown. "Yes," he replied, "and, probably, superstitious in the bargain. I am going to introduce ourselves to them in a fitting manner, having that thought in mind."

Placing a row of tall rockets along the edge of the cliff, he touched them off, one by one. High above the unsuspecting city they soared, finally exploding with loud reports and a great gush of crimson smoke. The effect upon the inhabitants was rather comic; something like the results of poking a stick into a nest of ants. They scurried out of the nearby houses and gazed skyward in wonder. Finally some of them descried us as we stood upon the edge of the cliff, outlined by the rising sun. And we did, undoubtedly, cut picturesque figures; for Brown had meanwhile ignited a train of red fire for our background and set in motion an ear-splitting siren.

CHAPTER IV

Converse with Atalia

A NUMBER of them came running to the foot of the cliff and made queer motions and words that we could not in the least understand, as though they rather expected us to take wings and fly to them.

"Not so," said Brown: "We will now retire to the shelter and give them an opportunity to come to us. I have no doubt that they know of some route of arriving at this spot that would take us days to find. Will you be so kind as to get me a couple of chairs?"

I turned to comply with his request, and looked in blank astonishment. Our comfortable shelter had completely disappeared!

Brown noticed my bewilderment and fairly danced in delight. "What did I tell you about the invisibility of our abode?" said he: "You would be a castaway, indeed, if I had not taken the precaution of marking the doorway with those two queerly-colored stones. Just walk right in between them and all will be well."

I did as directed and found myself, by a sort of Alice-in-Wonderland trick, within the shelter. It was uncanny to say the least and I could not resist the temptation of repeating the performance several times. It certainly made the Arabian Nights seem tame.

"If you think that so strange," said Brown, "get the stage effect of this one."

Forthwith he placed the chairs upon the roof of the shelter where, from the outside, they presented the optical illusion of being suspended in the thin air. As a further safeguard, he also placed a line of charged wire around the house to establish a deadline against the unduly curious.

We now took our station on the chairs, and, reinforced by the siren, a few more rockets, and a megaphone, we awaited results.

"How do you expect to come to an understanding with the natives," I said. "You cannot speak their language, of course."

"Do not be too sure about that," Brown rejoined: "For many years I have made a study of the ancient Sanskrit. I believe that language holds the key to all words modern or primitive. It ought to furnish a basis, at least, for some sort of an intelligent understanding. At any rate, we shall have an opportunity to try my theory out—for here they come!"

I looked in the direction he pointed out and saw a small detachment of soldiers, headed by an officer,

deploy upon the plateau near the talls, and march towards us.

When they came near enough, however, to get a good view of us they came to a full stop. Consternation, wonder, even fear, was plainly written upon their faces. Some of them, indeed, turned as if to fly. I would not have been in the least surprised to have seen the entire company turn tail; for we, no doubt, cut an awesome figure clad, as we were, in our glittering suits of wire and seated upon chairs that rested apparently upon nothing more substantial than air.

To augment this emotion, Brown touched off a couple of roaring rockets; but before this act could bring on a complete state of panic, he spoke to them, sharply, through the megaphone. They seemed to ununderstand him, for they advanced to a designated spot and came to a halt.

I noticed that the men were fine-looking specimens of humanity, somewhat above the medium height and of a decidedly Oriental cast of features. All were armed with short swords and long shields, and carried spears of the casting variety. I saw none who carried bow or arrow.

The leader of the band now stepped forward and spoke a strange language which Brown seemed to understand; since he translated it for my benefit.

"Oh! men of the air, whence do you come to this city of Atalia? Are you gods or men?"

Assuming his best state manners, Brown replied: "We are gods, who under the guise of flesh, have come to visit this, our dominion, for a brief while. Bear our commands to those in authority, that they be prepared to receive us as becomes our exalted station. Dispatch a swift messenger for that purpose, and arrange to convey us thither at once."

We, thereupon, descended our ladder on the far side of the shelter. This act gave the general appearance of a magical vanishing which, combined with my attempt to get a kodak picture when we again mysteriously appeared in view, almost broke up the conference. The dumbfounded natives started to flee in a panic.

Brown shouted sharply: "Halt! The first man who runs—dies!"

Instantly the entire squad threw themselves, face downward, on the ground as a token of submission.

"Arise," ordered Brown, "and do our bidding. We have no time for delay."

Brought to their feet again by this crisp command they formed, once more, into line and led us by a devious trail beneath the water-fall, and thence down to the highway that ran towards the great city. There they produced a sort of palanquin, borne upon the shoulders of four stout carriers, and hurried onward through a constantly-increasing crowd of curious inhabitants.

About two hours of this mode of travel brought us into the city; and in front of the portals of the imposing edifice we had first noticed from the cliff. Just what our reception would be within we were at a loss to conjecture. Much now depended on how well we carried out our bluff. Any concerted opposition surely meant our undoing.

We did not have to remain long in suspense; for our officers immediately conducted us into the building, through a long avenue of magnificent columns, and so finally brought us into a large and beautiful council chamber. At one end of the room stood a splendid golden throne, not as yet occupied, while rows of seats held a number of distinguished natives clothed in robes of bright-colored cloth. Evidently we were in the presence of the men who conducted the government of this strange land.

A Display of Power

I EXPECTED, of course, that we would await the arrival of the rightful occupant of the throne. Imagine my astonishment, then, when Brown advanced rapidly to that august seat and assumed the station, as his rightly-appointed place. At this bold action I rather expected a commotion among the assembled rulers. Indeed, a guard did attempt to lay a restraining hand upon Brown's person, but recoiled with a wild cry of terror. He had, evidently, come into unpleasant contact with the charged suit. None of the others offered to interfere when I followed Brown to the throne.

Placing a shrill whistle to his lips, Brown commanded attention and spoke as follows: "Men of Atalia, I now assume control of the affairs of state. All of you must obey my instructions. Let every man stand before me, according to his degree and harken to my words. I speak in the name of the gods!"

As they arose to do his bidding, a small door near the throne opened and admitted a very old man crowned by a circle of gold. He walked forward and I saw, at a glance, that he was blind. Brown, however, ordered the man to stand before him with the rest, although he was evidently the king. After some hurried conversation, the order was obeyed.

Brown was certainly carrying things with a high hand, and I was aghast as I thought of the outcome should his hand be called. The very boldness of his attitude, though, seemed to impress the assembly. I did notice, however, one sullen-looking individual who seemed on the point of protest, and I quietly called Brown's attention to him.

"Yes," he answered, "we are playing a desperate game. One false move and we are undone. Cover that person with your automatic and if he makes the slightest show of disturbance—shoot to kill!"

Addressing the council, he continued: "We come here as messengers of the high gods to examine the affairs of state and of men. While it is our pleasure to remain with you, let our material comfort be assured, our slightest commands, obeyed. Certain destruction will follow disobedience. Listen carefully to my instructions and see that they be promptly fulfilled.

"First: Let a guard be set around that place whereon we descended that none may enter thereon. Henceforth, it is sacred soil.

"Second: Let us present be conducted to a place

of rest, and guards be provided that none may come to us save those we summon.

"Third: Let that man"—and Brown arose and pointed out the native to whose sullen face I had called his attention—"be immediately seized and confined for future judgment. I read his purposes, and they are not to the liking of the Gods."

The individual thus publicly denounced, laughed cynically. "These strangers, claiming to be gods, are impostors," he cried: "They make threats—let them prove themselves!"

Casting aside his short robe, he drew forth a hidden sword and, swinging this weapon fiercely, sprang towards us. He had taken only a couple of strides forward, however, when my automatic spurted a stream of crimson fire; and down he fell in a huddled heap upon the marble floor!

This sudden and spectacular ending of the first attempt at rebellion threw the balance of the leaders into a state of confusion bordering on terror. It must have appeared, to their untutored minds, that death proceeded from us by a mere crook of the finger. At any rate, they offered no further resistance, but began the carrying out of our instructions in an alert if somewhat cheerless manner.

The officer who had been our former guide was designated to lead us to an elegant apartment facing on the palace court. Brown gave him orders to bring us food and, thereafter, someone versed in the history of the nation that we might question him upon the conduct of affairs of state.

The result of this latter command, brought us a very aged but distinguished individual who was introduced as the official Keeper of the Archives. Brown questioned him closely regarding the history and political divisions of Atlantis; it was all intensely interesting, as Brown told it to me later.

It developed, from this conversation, that the continent of Atlantis covered a vast extent of territory; part of which was inhabited by natives of a low order of intelligence. The ruling class, whose capital city this was, had arrived centuries ago, conquered the inferior natives and, until recent years, held them in a state of secure vassalage. Rebellion, lately, had become so frequent that the rulers had been forced to concede certain freedom and rights of participation in the government to the lower class as a price for retention of power. It was one of their representatives whom I had slain in the council chamber and the Keeper warned us that some act of reprisal by his followers was likely should they come to lose their belief in our divinity. The Keeper eyed us rather inquiringly as he spoke.

Much advancement had been made by the nation since the days of the first pioneers. The soil had become cultivated to a high degree, many fine buildings had been erected, and the population had grown from a few thousand to several millions. Yet, because of the immense area, most of the country was still unsettled. Also, many active volcanoes rendered the work of empire-building a difficult task. On numerous occasions, the efforts of decades had been made in vain because of the destruction wrought by these 'fire-mountains'.

This volcanic activity was, of course, assigned to evil spirits and a system of religion based on this phenomena had sprung into existence. It, also, accounted for the huge success of our pyrotechnic exhibition on the cliffs.

Of the higher sciences, we speedily discovered, these natives were ignorant; and they presented a curious composite picture of progress and ignorance that was almost humorous. In support of his statements, the Keeper produced many rare manuscripts written upon a sort of parchment in very odd characters. Some of these documents I intended to preserve and take with us on our return, with the most earnest hope of publishing them, together with some splendid pictures I had taken.

Among other matters, the Keeper spoke of the blindness of the king. Acting upon a sudden professional hunch, I suggested to Brown that we have the king brought in for an examination. Here was an excellent chance to impress, by an object lesson beyond dispute, our possession of supernatural powers upon any sceptics among the people.

Rebellion Lifts Its Head

WE, therefore, despatched the officer on that errand and, when the king arrived, a superficial glance at his eyes assured me that he was suffering from a case of simple cataract that could be quickly and easily removed. So I said to him through Brown: "O King, if so you desire I will give you back your sight. Thus, for a surety, will you know our kinship with the gods." Needless to state, the king welcomed this offer; it was as music to his ears.

A hasty investigation of my kit had assured me that I was in possession of the necessary instruments for this operation, a case requiring considerable deftness skill but little preparation. So there, in the presence of but a few witnesses, and assisted only by Brown, I performed a surgical operation unparalleled in all the annals of medical science, removing the blindness of a man dead ten thousand years!

I laughed aloud when the job was finished, and we had bidden the king wait till the morrow for the removal of his bandages and the assurance of renewed sight. Could it be possible that I actually did what I seemed to do? I was on the point, indeed, of questioning my own sanity; and yet I also knew that no man whose nerves was not steady and sure could have done the delicate work I had just completed.

"Brown," said I, "for the love of God, am I dreaming? Can this ridiculous, this impossible situation be real and true?"

My friend did not, however, take his usual attitude of levity towards this outcry of mine. Instead he replied gravely: "It is good, sometimes, to be shaken to the very core of our being. One clings too strongly to accepted and accustomed things. To be wrenched therefrom, is often painful but salutary."

He turned to our attendants with a crisp command: "Order the palanquin and see that the streets are

cleared of people. We will inspect the city immediately."

Presently we began a very interesting and instructive tour of the great city. It was of symmetrical design, with many beautiful buildings ornamented by wonderful carvings. The river divided the city into equal parts; our officer in attendance, informed us that, whereas once the conquered races had been confined to the far side, they now were scattered over the entire city. Also, that they were of a moody and vindictive nature; especially so since the death of one of their leaders at my august hands.

This sentiment became plainly evident as we progressed. We noticed, at the windows of the building, angry and sullen faces. Because of the soldiers who patrolled the streets, however, no attempt at overt acts was made.

Even Brown was somewhat shaken: "We will get us back to our shelter no later than tomorrow. A million to one is too heavy odds."

The remainder of our tour we cut short because of this threatened attitude; but in the brief time we spent, we saw enough to convince us of the extent and high cultural development of this ancient people. It was certainly a marvelous education, and I speculated much on what might have been the present condition of modern civilization had this vanished race lived to hand down to posterity some of their early accomplishments.

Brown evidently had an eye to possible emergencies; for the first thing he did, when we again arrived at the palace, was to place several mysterious cans in the courtyard near our apartment. These cans he connected by a fine wire and the wire to a small battery in our room. "Now," he exclaimed, "I feel safer. Any hostile visit from the natives of this city will surely meet with warm reception. I trust, however, we will not be called upon to use this form of welcome."

His hope, however, was not realized; for we were aroused at midnight by an ominous uproar on the outside. Even our attendants were terrified and urged us to flee to more secure quarters. "The mob," said they, "have forced the outer guard and will be upon us in a moment."

"Not so," coolly answered Brown: "Immortals do not fly in the face of threats. They act!"

We arose and walked out upon the balcony. The court-yard was filled with a mass of infuriated natvies armed with a variety of weapons. They immediately descried us, outlined by the flaming torches they carried, and rushed towards the window, leaping and shouting fiercely.

"Begone," Brown commanded: "In the name of the offended gods, I bid you, instantly, to disperse!"

But, as the mob paid scant attention to this order, and pressed forward to hurl missiles of various kinds at us, we deemed it to be the better part of valor to beat a hasty retreat.

"Not so good a showing for gods," said my companion: "But, joking aside, this is getting altogether too warm for my liking. So, here goes!"

Forthwith he pressed the switch of the battery. Instantly the semi-darkness of the palace-yard was lit up by a lurid gleam, followed by deafening reports, a confused medley of human sounds, and silence. When next we stepped upon the balcony, we saw only the dead; the raging mob had fled, leaving behind only the victims of their own impotent fury. Even our personal attendants had departed in a panic; so that we spent the balance of the night in peace. Great had been the triumph of science over brute force!

Early, next morning, we despatched our officer to summon the rulers into another conference. Here, seated again upon the king's throne, Brown spoke rather sharply of the state of affairs. Said he: "Men of Atalia, we go to our realm of the gods to make report. In some respects we are not overly pleased. Many have conspired to make our stay unpleasant; indeed, have even threatened our august persons. As for these, I bid them beware! The gods know full well how to protect their servants.

"Others, however, have rendered us faithful and obedient service. Among these are the King, his officer, and the Keeper of the Records. Upon the latter I, now, confer a ring; it shall be an order of merit that forever entitles him to sit upon the right hand of the king. To the king, himself, I have given new vision. Let him be summoned to this station."

When this command was accomplished, I removed the bandages that covered his eyes. With a cry of delight he knelt at our feet. He now could faintly distinguish the light of day after years of total darkness. A murmur of astonishment ran through the assembled leaders; here was a testimony of our supernatural powers that none could deny.

"If this faithful officer," Brown continued, "desire to venture further with us, I will conduct him even into the realm of the gods, themselves!"

That officer fell on his knees before us: "Oh, servants of the most high, I do accept this great boon. I leave none behind to mourn me here."

"Good," exclaimed Brown: "Prepare then to go thither at once." Turning to the king, he continued, "You, we command only to furnish us with a safe escort again to our place of arrival. See to it that there is no miscarriage of these orders, or such calamities shall be visited upon this land as may never be forgotten—no, never!"

But for the very real dangers of our present situation, I could scarcely compose my merriment at the heroic words and attitude of Brown. Still there was something prophetic about them too, as I well knew—looking, as I did, down the path of time.

The king, however, was much impressed with them, as well as filled with gratitude for the boon of his restored sight, steadily growing more acute. So he gave the necessary orders to his palace soldiers to carry us forth, and placed our officer in command of them. This was all well so far; but I trembled when I remembered the temper of the mob of the lower citizens. Had the guard sufficient strength to see us safely through?

While waiting for our escort to arrange the journey, I took one last survey of the unique assembly.

It was certainly a spectacle to be cherished in the memory—this conclave of the dignity and splendor of an ancient state, a state to be presently blotted out of existence—the rulers of a vast continent that once stretched across the great Atlantic Ocean, but now is nothing but a tradition.

At last our escort gave the command to march, and we passed out into the street. One glance at the mass of people thereon, renewed all my misgivings. They had gathered about the palace gate in thousands and on the whole they had an ugly look. They even sought to rush our escort; but these, under the orders of our gallant officer, formed in a solid square and forced the mob back with so determined an air that we won our way out of the city with no great difficulty. Nor did we encounter any real resistance until we came to that narrow mountain trail that led to the high plateau. Here, however, the escort came to an abrupt halt. The enemy had seized the pass from the soldiers that had been set to guard it, and had erected a barricade of stone and timbers across the path. Unless we forced that obstacle promptly, we were lost; for the balance of the mob pressed us closely in the rear.

As on all other occasions, Brown arose to the emergency in a superb manner; he seemed, in truth, to have foreseen all possible needs and to have provided for them. For this grave danger, he produced a small but powerful metal bomb and, giving order to the escort to follow him, he ran swiftly ahead. Unmindful of the shower of spears that greeted him, he hurled the bomb at the barricade, which promptly vanished before the giant blast. Through this gap we ran for our lives, pursued by the howling mob. The sight of us in flight evidently served to weaken their fear of our divine attributes, in spite of our recent display of them.

The officer formed a rear guard, seeking to hold the mob back. This they did, but at a terrible loss of lives to his men. So hotly did the battle rage that we were forced to drop most of the exhibits we had so proudly accumulated. I did, however, hold to my camera and a roll of parchments with one hand as I emptied my automatic with the other.

Thus we came to the shelter but, even at its very entrance, it appeared that we should be overcome. Nothing but our finely-tempered suits of woven wire saved us from instant death. Indeed, one burly native overthrew Brown with his spear, and might have slain him had it not been for the help of the officer, who came to the rescue in the nick of time but was himself badly wounded in the conflict. Brown sprang quickly to his feet and, between us, we bore the injured officer through the door of the shelter, slamming the door itself fairly in the face of several of our eager foeman. These men were thrown into a state of bewilderment when they rushed after us to meet a solid object completely invisible to them, as we ourselves had suddenly become.

Still we wasted no time in speculation as to the results. Brown ran panting to the controls and reversed the switch. Instantly the sounds of turmoil, on the outside of the shelter, died away in a confused murmur. We were launched a thousand years into space in the twinkle of an eye.

And so began the forward flight along the path of time, back to the land of reality. But then came the amazing thing. I looked around for the native, and behold, he was gone! Gone, also, were the things I had taken from Atlantis! I pondered deeply over the whole strange situation. In spite of the testimony of my material senses, I could not shake off the feeling of illusion, of the utter impossibility of our present adventure. Yet, this strange feeling might be caused by the very newness of the conditions, in which I found myself—after all. I felt in sympathy with the countryman who, viewing for the first time a tall giraffe, said to his wife, "By gum, Martha, there ain't no such animal." Laughing at this thought, I propounded the enigma to Brown.

"There is still a certain amount of 'die-hardness' in your mental composition," he explained: "Still a shadow of the dead past that, like Banquo's ghost, springs up to spoil the feast. Here you have participated in a series of marvels without equal in the achievements of science; in very person you have seen them. Yet you doubt, you quibble, you question!

"Once I was only sick and tired of this stubborn spirit; now I am beginning to have some compassion. It only personifies the conservative attitude of the world, an attitude that refuses to recognize truth until there is no way of squirming away from it. But, because you are my friend, I will make one more effort to bring you to the light.

"It is difficult for me to put the problem in language that will convey my exact meaning. Compare it, if you please, to memory. Upon the tablets of the mind are engraved each object seen, every sound that is heard, aye, even the smallest thought that occupies our waking moments. There is good reason to believe that these mental impressions are never erased, although our power to summon them again to active expression fades away as we recede further from the date of the occurrence. So, on a larger scale, upon the scroll of time itself, is minutely inscribed each detail of life down to the most insignificent fraction. In truth are these passing events preserved forever, though generations of men see them no more—indeed, have even no record of them at all.

"Still another illustration occurs to me. Suppose that you were instantly transported, say, about sixty light-years distant from the earth, and were able to visualize the images that the reflected light brought to you. What would you see? Not the present events of the planet, to be sure. No, you would witness the life enacted upon the earth sixty years ago. You might even be so fortunate as to see, as some giant moving picture, one of those great battles of history. To you it would have all the dramatic effects of actual reality. As a matter of fact, the living actors have passed away, for the most part, years ago. In like manner, as you receded further and further away from the earth, so would you push back time even to the beginning of the world.

"After some such fashion as this, have we been spectators of the life upon that ancient continent of Atlantis—with the vital difference, though, that we have approached thereto within the fourth dimension and have thus been able to introduce ourselves as actors, rather than as mere spectators, into the events of that remote period. But we have been unable to bring back with us material evidence of our exploits, rather memory pictures only. For as we know these things of the past are decayed or dead; they cannot be revived.

"So much for our past experiences. Within this charmed circle there are wonders to explore that will make our present venture seem poor by comparison. Many of these exploits I hope to soon accomplish. When I do, then that incredulous race of deluded mortals will surely sit up and take notice. Oh, it is going to be sweet music to my ears to listen to their foolish excuses! How they will twist and squirm as they seek vainly to justify their stubborn course!"

Brown, at these prophetic words, seemed fairly to expand. Some inward light of mastery gave him a sort of glow as though he visioned a far-off transscendental land and reflected a measure of its glory.

Indeed, as I stood then against the outer door, I was filled to overflowing with admiration at his eloquence. I meant to voice this sentiment, but—alas!

I found myself, at that very moment, prone upon the floor of my office, with my assistant bending in astonishment over me. Of Mr. Brown, the wonderful shelter and the house next door to mine there is no visible trace! Yet I still have on my finge ra blue mark that will not disappear, and a half-empty fire extinguisher hangs upon the wall.

THE END

What is Your Knowledge of Science?

Test Yourself by This Questionnaire

1. How can the location of a radio transmitter be found? (Page 588).
2. What is a hydrocephalic dwarf? (Page 591.)
3. On what principle does the microphone operate? (Page 623.)
4. What is the meaning of "ichor?" (Page 598.)
5. What is the length of the Jovian year compared to ours? (Page 609).
6. If one were on a planet 60 light years from the earth, what events would he see here? Why? (Page 616.)
7. What is the length of a Martian year? (Page 638.)
8. What is the meaning of levitation? (Page 638.)
9. How do the forces of electricity and magnetism work with relation to each other? (Page 641.)
10. What is the explanation of the action of a nerve impulse? (Page 645.)
11. What is meant by the earth's inferior conjunction, as seen from Mars? (Page 648.)

To Readers of Science Fiction and Lovers of Aviation

If you are a lover of science fiction, you must certainly obtain the December issue of AIR WONDER STORIES, now on all newsstands. This magazine specializes in science fiction in which aviation of the future is featured. You will find here your favorite authors in stories as stimulating and exciting as those in SCIENCE WONDER STORIES.

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THE FLIGHT OF THE EASTERN STAR
By Ed Earl Repp

FREEDOM OF THE AIR
By Edsel Newton

CITIES IN THE AIR
By Edmond Hamilton

THE PHANTOM OF GALON
By J. W. Ruff.

And Other Stories as Well as Interesting and Educational Features, Aviation News, Aviation Forum, Letters from Readers.

The RADIATION *of the* CHINESE VEGETABLE

by C. STERLING GLEASON

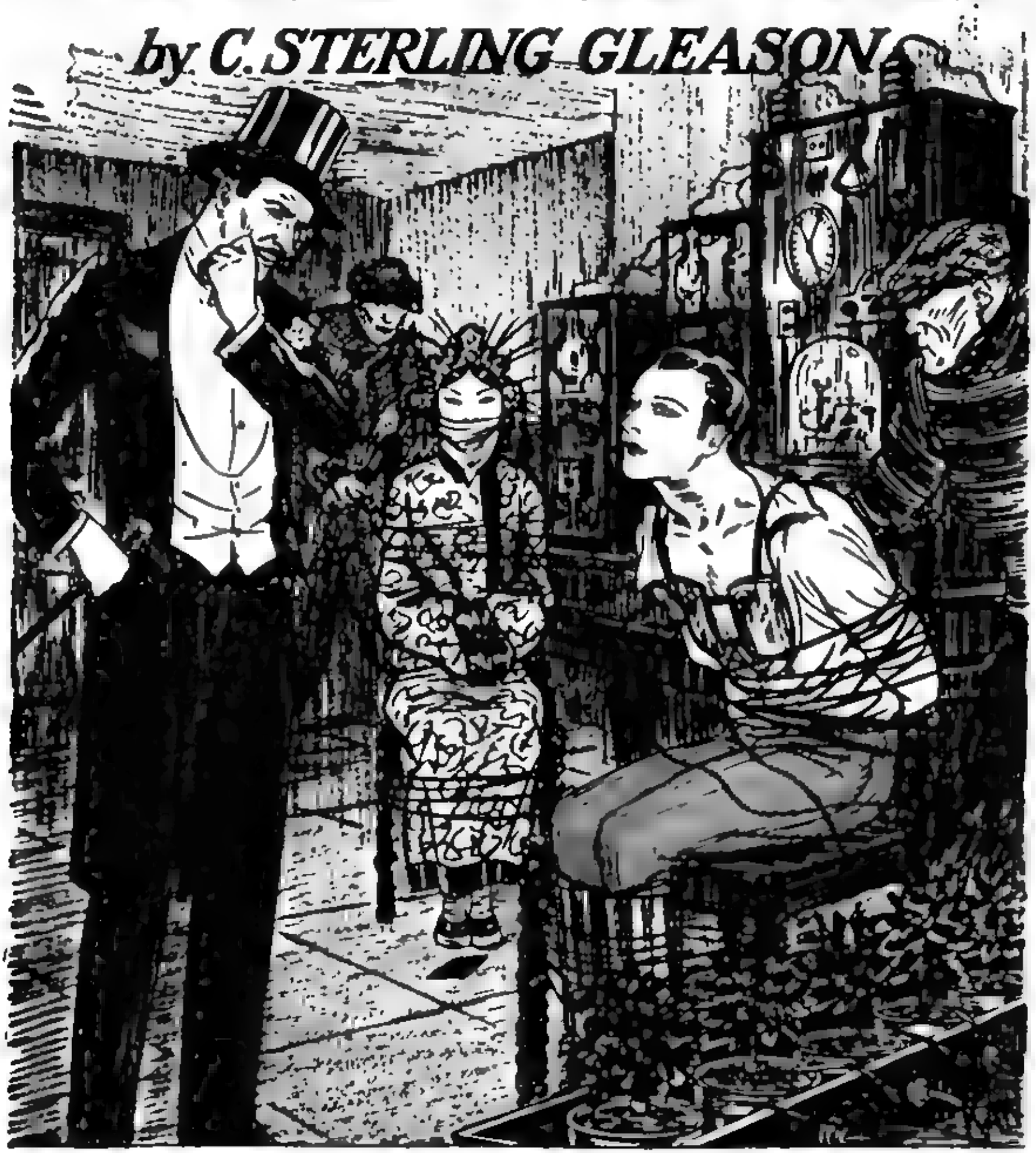


Illustration by Wesso

"Before the girl leaves this mortal sphere she shall tell all," said Diavolo, "when she feels the insidious thrilling of high frequency penetrating the marrow of her bones, she will divulge the secret recipe."

THE RADIATION OF THE CHINESE VEGETABLE

OUT in the West, where the suey is a little stronger, far out west, where the noodles grow a little longer: in Hollywood, that distant metropolis of millionaires, movies and Mammon, that capital of sin and the cinema, stands the quaint Oriental building which houses the chop-suey parlor of lovely Wun Look. Here are wont to come all Hollywood's greatest, to refresh and rejuvenate themselves with Wun Look's superlative chop suey. Hither at noon come busy captains of industry, to fortify themselves against the grilling afternoons of golf. Hither, after strenuous days of whole-souled labor for Art's sake, come famous film stars, many of them remaining long after the curfew has sounded, held simply by the lure of Wun Look's magnificent menus. Hither often comes that supreme figure in filmdom—Harold Dare, greatest of screen heroes, and also connoisseur and patron of the art of chop-suey preparation. Here, too, is sometimes seen Dandy Diavolo, that peerless villain of the Flicker Films, whom millions of right-minded film fans hate as the lifelong persecutor of the great hero.

C. EVERETTE GLEASON

Who knows how many of Harold Dare's great benevolences have owed their inspiration to the subtle, satisfying savor of Wun Look's chop suey; or how many of the diabolical deeds and devious devices, as crooked and intertangled as the very noodles of Wun Look's chow mein, have been incited by some mysterious ingredient of that inscrutable black sauce which lends the last delicate piquancy to the eggs fooyong?

Yet even the idyllic occupation of chop-suey preparation is not fully free from the frowns of Fate. Came a day when the great Harold Dare spoke gently to the Chinese maiden, seeking to learn why the chop suey had lost its wonted savor. With great tears in her lustrous dark eyes, the girl answered: "O, Mr. Harold, that is what all the people ask to know."

And she told a tearful tale of sordid commercialism, of a monstrous monopoly that threatened to strangle the essential art of chop-suey making. An unscrupulous broker in Chinese vegetables—Yet Un-Hung by name—had cornered the market and would supply only his own chain of inferior chop-suey palaces with the ingredients necessary to the synthesis of AAA1 chop suey. It was his plan to force out all competition by cutting off the supply of the constituents of chop suey.

"Is there no other way to get the vegetables?" demanded Harold Dare, his great soul instantly filled with righteous indignation against the conscienceless market manipulator, whose merciless machinations threatened the very foundations of this essential industry.

"No, Mr. Harold," replied the girl: "They will not grow in America. Only in a certain part of China, where the weather is kind."

"Then," said Harold, in sudden strong resolution, "we shall grow them here." And from the great Dare research laboratories, maintained by the celebrated screen star in the interests of the public welfare, came famous scientists with complicated electrical instruments, to conduct tests and experiments, and to delve deeply into the mysteries of growing the exotic Chinese plants.

A Dastardly Plot

WITH the full facilities of the Dare laboratories concentrated upon the problem, the solution was soon found. Treated with regular applications of high-frequency electric current, the essential vegetables responded vigorously and grew with incredible rapidity. The stimulating action of the electricity, in accelerating cell growth and aiding metabolism, caused them to grow to twice the size of the ordinary plant; and their flavor was even better than that of the imported vegetable. A few test dishes of chop suey made with the new product were sampled by famous connoisseurs of Chinese cookery, and pronounced superlative in the *n*th degree.

At length the research was complete. Wun Look, in her gratitude, planned a dinner for Harold Dare and his famous chief engineer, the great Scott, under whose direction the experiments had been carried on. In the basement of the Wun Look "chop sueyrie," where most of the research had been carried on, against that background of modern science she would serve a banquet. She would serve with her own hands a banquet in traditional Chinese style—a banquet the most august mandarin might look upon with envy.

To Harold Dare was sent a note, requesting that he set a date for the event; that question being referred to Dare's synchronizing

IN presenting this well-known writer of radio fiction stories to our readers, attention is called to the fact that the author is a radio authority of considerable reputation. Mr. Gleason has made many inventions of different radio instrumentalities and has then written a story around each invention.

In practically all cases the story contains material that is practical and can be translated into actualities by anyone who has the necessary apparatus.

In this particular story the author shows us how it is possible with existing radio apparatus to find an astoundingly new method of operation.

Incidentally, the characters of Mr. Gleason's stories are well-known to a large circle of radio enthusiasts; and the whimsical humor contained in his stories is always as refreshing as it is original.

social secretary, the tenth of the month was chosen. It was obviously necessary to make arrangements for photographers to be present, to record for posterity this crucial moment that marked the inauguration of a new era in the chop-suey industry.

The proper papers were prepared by the secretary, and the file left on Dare's desk for signature. When the great star stepped into his office to give executive matters a few moments' attention before leaving the lot, he found this paper, made a mental note of the date, and affixed his signature to the order.

When he had left the office, just at dusk, no one saw a furtive-faced man slip into the room, close the door behind him, and a moment later make a hurried exit and disappear into the darkness. At least, if anyone saw him, it is not recorded. But, when Harold Dare's secretary prepared the necessary memoranda for arranging the event, he found that apparently the star had decided to postpone the dinner one day; for the numerals "10" had been crossed out, and "11" substituted.

* * * *

It was early in the evening of the tenth that Harold Dare drew up before the Wun Look chop sueyrie and, dismissing his chauffeur for the time being, strode into the ornate dining room of that celebrated palace. He thought it not a little strange the photographers were not yet there to welcome him; but, since no one was in sight, save several undistinguished patrons dining in private booths, he passed back to the stairs and descended to the basement.

"Wun Look!" he called; but there was no answer. The basement was dark, except for a crack of light that showed beneath the door of the improvised laboratory. He grasped the knob and stepped into the room—

Harold Dare felt strong hands grasp his wrists. He struggled, but vainly; a wide leather belt was drawn swiftly about him, pinioning his arms to his sides, and the cold muzzle of a revolver pressed against his cheek.

"Not a word, Harold Dare!" hissed a familiar voice in his ear.

"Dandy Diavolo!" The words came instinctively to Dare's lips as he recognized his villainous archenemy.

"Yes, my proud hero," sneered Diavolo, "you are my prisoner. You thought to come to a banquet, celebrating another of your so-called triumphs. But I have other entertainment for you, my fine fellow."

Two ruffians drew Dare forward and forced him back into a chair. One seized each arm, while others pulled him down to a prostrate position and bound him fast.

"What does this mean?" demanded Dare.

"It means," replied Diavolo, with an evil leer, "that you have gone a step too far in what you term your benevolences. You little recked, when you gave orders to your laboratory men to attempt to grow Chinese vegetables under radio-frequency stimulation, that you were running counter to powerful interests. You did not realize that I myself own a half-interest in the Yet Un-Hung chop-suey chain. You perhaps do not know that I myself am responsible for your being here today instead of tomorrow. I caused one of my men to alter the date on the requisition after you had signed it; so that while you understood that the dinner was to be on the tenth, all preparations have been made to receive you on the eleventh. And now your ambitious scheme is to be the cause of your own downfall!"

The Plot Thickens

THEY were baring Harold Dare's chest, and upon it placing a large square of metal-meshed cloth. Behind him, they slipped a similar area of the same material, so that the cold metal was firmly in contact with the flesh. To each they attached a long flexible cord, which they draped over chairs and extended to the large panel of the radio-frequency oscillator which had supplied the current used in treating the vegetables.

"You will observe," remarked Diavolo, as he made fast the ends of the wires to terminals of the oscillator, "that only the best type of equipment is used by the Dare laboratories—a fact for which I am personally grateful. This oscillator is designed to furnish considerably more power than would be necessary to treat double the number of plants I see here. I note with approval that, instead of the spark type of apparatus, which is commonly used—even by hospitals—the Dare technicians have substituted a powerful vacuum-tube oscillator, capable of delivering continuous-wave oscillation, which carries more energy and thus has greater thermal effect than the damped wave emanated by a spark circuit."

Dare understood his reference. He himself had had experience with that type of apparatus. Once, when he had been afflicted with a cold and a sore throat (which was extremely inconvenient in that it interfered with the filming of the current talking picture then in production) Scott had recommended that he be treated by diathermy, and had had the equipment sent up to Dare's residence. Doctor Fredericks, Dare's personal physician, then administered a treatment in much the same way as Diavolo was now preparing to do. The electrodes, placed on either side of the patient's chest, were energized by a high-frequency current which, in passing through the high resistance of the tissues, dissipated much of its energy in the form of heat; with the effect of stimulating the circulation and clearing up the congestion. In a few moments the current had done its work, and Dare, glowing through and through with a gentle heat, had risen, cured by the treatment.

"It is very thoughtful, Diavolo, to take the trouble to give me a diathermic treatment," said Dare, "although I must really confess I do not feel the need of it at the present time."

"My purpose," replied Diavolo, "is purely edu-

cational. I propose to demonstrate to you that high-frequency oscillations, although useful in stimulating the growth of vegetables and curing colds, may be put to even better use in ridding the world of a person whose life has been spent in amassing a great fortune, simply by making millions of film fans hate me. By passing through you the full strength of the current generated by this equipment, I shall produce heat just as in medical diathermy—by the dissipation of energy in cell tissues. But an oscillator of this power will raise the temperature far above the slight warmth produced by the ordinary outfit. One can cook a steak, by passing a heavy radio-frequency current through it; and that, Harold Dare, is to be your fate—to be cooked alive, by the very instrument of your intended triumph!"

With a stroke of the pliers he cut the wire that led to the long row of tiny plants, each with its miniature electrode gently clasping the frail green stalk. "Lest any of the current be diverted from our purpose, we shall disconnect the vegetables from the apparatus—"

There was a noise at the door. Harold Dare sensed it first.

"Stay out, Wun Look!" he cried; but too late. One burly ruffian flung open the door and seized the startled maiden. Before she had even realized what was happening, he had clapped a hand over her mouth and drawn her roughly inside. In an instant they had improvised a gag and were binding her to a chair. The beautiful almond eyes were filled with tears of uncomprehending woe.

"Never mind, Wun Look," said Harold Dare, gently: "They've got me, but they won't hurt you."

"Fool!" sneered Dandy Diavolo: "Little you know about it. We have two distinguished guests. Certainly we must entertain the lady in a manner befitting her station. Hook her up, men!"

The henchmen uncoiled another pair of wires and prepared to run parallel connections from the oscillator. With dismay Dare saw their evil intent. He knew it was futile to attempt to appeal to the finer feelings of the fiend. Better to try to touch the creature's selfish impulses.

"Do you realize, Diavolo," he said, "that with Wun Look will die the secret of preparing the finest chop suey that has ever been known to mankind?"

"You are right, Dare, for once," agreed Diavolo, with an evil smile: "That would be true—but I have foreseen that circumstance. Before the girl leaves this mortal sphere, she shall tell all. When she feels the insidious thrillings of the high-frequency penetrate to the very marrow of her bones, and feels a mysterious heat begin to burn the very tissues, she will soon divulge the secret recipe."

"You display your ignorance of the Chinese character," said Dare: "You apparently do not realize that, rather than give up the cherished secret that has been handed down through the centuries from mandarin to mandarin since the time of Confucius, she will perish with a smile. Would she shame the memory of her ancestors, who faced unspeakable tortures or even death itself to protect the formula from the hands of infidels? If you believe so, you do not know Wun Look!"

"Perhaps you are right," conceded Diavolo, grudgingly; "but it will do no harm to try."

"You are taking grave risks, Diavolo," pleaded Dare: "You may easily carry the experiment too far, and snuff out the life of the delicate maiden. Would you deprive the world of the final fruit of thousands of years of development—the finest flower of the chop-suetic art? Think what it would mean to you, Diavolo. Could you carry on your work as master villain of the films, unsustained by the splendid nourishment of Wun Look's chop suey? Imagine yourself at the end of a long day of grilling work before the camera—your energy depleted by hours of giving forth the best that is in you—in putting forth to the world your magnificent conception of the true soul of the sneer, the wholly evil leer, all for the sake of your Public. Then think what it means to be able to sit down to a bowl of steaming chop suey, to feel your spirit revived by the savory odor of exotic Chinese vegetables perfectly prepared by the skillful hands of Wun Look, to feel the sharp tang of the suey send shivers of satisfaction along your spine, and your energy restored for another day of artistic endeavor. Can you bear to deprive yourself of such a comfort, or to take from the cinema world its chief staff of support, to cut off the principal source of inspiration of innumerable Hollywood screen stars, and to endanger the interests of your Public, over which your sneer has ever held such potent powers? Dare you, Diavolo?"

A Breath of Hope

FOR a moment Diavolo wavered; then Dare knew he had won.

"Spare the girl!" commanded the monster; and beautiful Wun Look, suddenly succumbing to the reaction from the tremendous tension of this horrible ordeal, swooned away into blessed unconsciousness.

Diavolo wheeled upon his henchmen. "We are forgetting our duty as hosts!" he exclaimed: "We have forgotten that we have the celebrated Harold Dare as our chief guest of honor. We had planned a warm reception for him; let it proceed!"

The henchmen sprang to the controls of the oscillator. One flicked the switch which set a motor-generator whirring; another turned a rheostat and brought the filament of the large vacuum tube to a cherry glow. Needles flickered and climbed as the oscillator settled to its work.

A feeling of warmth surged through Dare. Had he not realized its terrible significance, he would have rejoiced in it. But, as the current rose, Dare's mind was racing. What possible hope might there be for escape before the insidious, penetrating heat had so benumbed his faculties that movement was impossible! Even if he could break the bonds which held him fast, he was outnumbered six to

one; and moreover, he was without a weapon, while Diavolo's men were heavily armed. It was useless to try to summon help by shouting, for he knew that any such attempt would only hasten the end.

The heat was becoming intense. It was relaxing his muscles, and Dare knew that he must act now or never. The face of Diavolo twisted in a cruel smile as he saw the desperation in Dare's eyes.

"And how is the treatment progressing?" he taunted: "Do you feel that after a few more moments you will be able to resume your rôle as super-hero of the films?"

"Certainly," replied Dare, still the dauntless hero: "Have you not learned by this time, after all your years of experience in the motion-picture industry that, in the end, right always triumphs, and that in the last reel, villainy must receive its just punishment?"

"But remember, Harold Dare, this is not a scenario," triumphantly rejoined the arch-villain: "In your film career, the facile pen of the scenario writer has time and time again saved you from your richly-deserved fate. This time there will be no such interference. You have foiled me for the last time."

"The end is not yet, Diavolo," said Harold Dare, with a smile that cost him much. The current was finding an easy path and the heat permeated his chest oppressively, making it difficult to breathe. He was becoming very drowsy. His eyelids drooped lower and lower.

From somewhere far off came the sound of a clock striking the seventh hour. Diavolo heard it. "It is growing late," he exclaimed: "Cannot the thing be hurried?"

He stepped to the controls and advanced the rheostates to the utmost. A fresh surge of heat swept over Dare. Involuntarily he drew a sharp breath. To his surprise, he found that the pain was less when his lungs were full of air. Then, reflecting, he saw the answer. The expansion of his chest forced the electrodes farther apart, making the path of the current longer and hence of higher resistance. He experimented, and found a certain amount of relief in breathing very deeply. Out of the corner of his eye he could see the needle of a meter fluctuate slightly with his movements.

Suddenly a wild hope seized him. With an effort he fought off the drowsiness.

"There is one thing that you did not know, Diavolo," he said, in an offhand manner: "You have spoiled one planting of vegetables. You will have to wait several days before you can have your chop suey."

"What do you mean?" scowled Diavolo.

"I mean that the time has passed for the treatment of the plants. In order to get good results, one must treat them regularly. The scheduled time is half an hour past, and already the leaves are drooping. This planting is spoiled."

"You lie, Harold Dare!" cried Diavolo: "It is merely a trick. I see it plainly. You thought that you would entice me to connect the plants into the circuit, so that some of the current would be diverted and you would be relieved." Nevertheless he stepped over and examined the tiny leaves. They were indeed drooping slightly.

"Perhaps it is not yet too late," muttered Diavolo to himself. He picked up a lead from the oscillator and clipped it to the rod which acted as a distributing lead to the plants. The current in the wire leading to Dare dropped slightly. By turning a control, Diavolo managed to restore the reading.

Dare took a deep breath: "You see, Diavolo, you will do well to believe me. Even during my last moments I must pursue my lifelong policy of returning good for evil. Therefore I will tell you that you may, perhaps, be able to save the plants if you continue the treatment for thirty-five minutes, instead of the ordinary twenty."

"Yes, my proud hero," snarled Diavolo: "I can promise you that. It will probably take that long to finish the ceremony of welcome which I have planned. After that, my other guest will go with me upstairs, and prepare me a dish of chop suey—under the supervision of my henchmen, who will take good care to record the recipe correctly. It will be an excellent stroke of business, to announce in tomorrow's newspapers:

"WUN LOOK CHOP SUEYRIE MERGED WITH YET UN-HUNG CHAIN
Ancient Recipe of Mandarins Acquired by Local Concern"!

"Dandy Diavolo," said Harold Dare, in a low, resonant voice, which came, it seemed, from the very depths of his chest, "I must admit your cleverness. It was a shrewd scheme, to lure me to the basement of the Wun Look Chop Sueyrie, located at the corner of Hollywood Boulevard and Abalone Street, and here to threaten me with death in the shape of a heavy radio-frequency current passed through my chest. You have applied science to work your fell purposes, and now bid fair to have succeeded. In a few more minutes, you probably will have done away with your hated rival, and Harold Dare will be no more. But be not too sure of yourself until that time comes, Dandy Diavolo. I, too, know something of science. Perhaps there are others beside yourself who are using it as a tool to their own purposes—even your present victim."

"What are *you* doing?" demanded Diavolo, with a sneer.

"I am sending out invisible waves, too intangible to be grasped by your crude senses, to my unseen millions of fans everywhere. Anyone who is a friend of Harold Dare can save him from a terrible death by coming instantly to the Wun Look Chop Sueyrie, at Hollywood Boulevard and Abalone Street, Hollywood, California."

"Ho!" snorted Diavolo. "Mental telepathy, I suppose. No doubt, while sitting there you mastered the secret of communication between minds without the aid of any intervening apparatus."

"You would not be so calm," said Dare, "if you knew that somewhere in the outside world, someone at this very moment has just heard that I am the prisoner at the Wun Look Chop Sueyrie, Hollywood, and is speeding to the rescue. You doubt it; but I have the faith to believe it."

"You shall soon learn the folly of such over-confidence, my fine fellow," retorted Diavolo.

Dare's head was sinking lower and lower upon his breast. The heat was dry and scorching; it seemed that the blood was carrying the stinging heat to every part of the body. His eyes closed; he lay limp and still.

"Where, now, are your boasted friends?" taunted Diavolo: "Why do they not come to your rescue?"

With a tremendous effort Dare opened his eyes. "Remember, Diavolo, that only in the end can you be sure of the success of your villainous schemes. It is the very last moment, the final reel."

His eyes, turning vaguely toward the door, beheld a strange sight. Diavolo, catching the sudden change of Dare's expression, followed his gaze.

Beneath the door, a flood of intense, bluish-white light poured across the threshold. Two shadows flickered across its path.

A scuffling of feet, a quick rush, and suddenly the door splintered and fell inward beneath the attack of two brawny policemen. Diavolo and his henchmen were drawing their guns; but too late.

"You are covered. Not a move!" snapped a pre-emptory voice, and in the tremendous glare of a screen floodlight, the great Scott advanced with drawn revolver and disarmed the chief villain and all his yes-men. Behind the powerful arc, a trio of camermen ground their cameras; and now an assistant stepped forth with microphone in hand, while others adjusted mixers and all other equipment necessary to the recording of this impressive scene for the outside world.

While Scott slashed the bonds that held Harold Dare captive, an announcer was speaking into the microphone which was connected through remote-control equipment to the Dare broadcasting station, WROT; and as the great star rose from his prostrate position, a microphone was thrust into his hand and he was asked: "Won't you say a few words, Mr. Dare, to your vast unseen radio audience —something to reassure them that you are safe and sound at last?"

With a gesture Dare waved aside the microphone. "Friends of the air," he said, "I have first one duty to perform—to my beautiful companion in distress." And while the millions waited, he seized Scott's keen knife and strode to the side of Wun Look. In an instant he had cut the cords and released the maiden from her pitiful plight. Scott drew from his pocket a small vial: "Here are aromatic spirits of ammonia. They will revive her."

Dare forced a little of the liquid between the lips of the unconscious girl, and before the clicking cameras, beautiful Wun Look slowly opened her almond eyes and blinked bewilderedly under the glare of the arcs. "O, how to come here, Mr. Harold?"

Then to that circle of sound-recording cameras and to that vast radio audience, Harold Dare told the story of his rceent harrowing experience:

"I was getting pretty warm, with the oscillator passing a heavy current through my chest, and it seemed impossible to escape, unarmed and outnumbered as I was by Diavolo's men. Then I happened to notice that, as I breathed, the current varied with the motion. By a process of ratiocination I deduced that this effect was due to the greater resistance of the chest when expanded. I was instantly struck with the resemblance of this phenomenon to the action of a microphone. Now, it is well known that any apparatus will act as a microphone if it will vary electrical current in proportion to the physical vibrations that constitute sound. In this case, my chest itself had to act as the diaphragm. By using deep chest tones, I caused the voice vibrations to be centered about my chest and give a maximum displacement; thus increasing the change of intensity to a comparatively large variation. Since the vocal vibrations caused the radio-frequency current to vary in exact accordance with the speech, the current in the circuit was modulated with the voice, just as with the carrier wave of a broadcasting station. As I had hoped, someone outside happened to pick up the radiation from the long wires running to the Chinese plants, which acted as antennae projecting the wave into space. I see by the look in his eye that it was Scott who did this; and the truth of my surmise is attested by the way in which the rescue, with its splendid communicative facilities, was carried out. It is he whom you have to thank for this broadcast.

"As for Dandy Diavolo, he is now only too well aware of the truth of the great principle that has been taught by every Dare photoplay in cinema history: namely, that right eventually triumphs over wrong, and villainy is properly punished. Is it not true, Diavolo?"

"Dare," replied Diavolo, "—and friends of the air, out there at the other end of this great radio hookup, I am beginning to see the truth of the great maxim preached by my lifelong enemy and Nemesis. Undoubtedly the hero business pays better dividends. While Harold Dare is universally honored and acclaimed, my fans only hiss me—it is my lot to make them hate me. Perhaps some day I shall realize my ancient ambition to become the great hero that Harold Dare now is. But until that time, I must ask my admirers to address me—"

"In care of the jailer at the State Penitentiary, Diavolo," interrupted Dare: "This is no time to advertise. When you have learned your lesson and forsaken your evil ways, then you can count on my hearty cooperation; until then, the minions of the law must guide you in the ways of rectitude. Come, Wun Look. Let us dine on chop suey, made with vegetables raised by the same radio-frequency vibrations which have proved our savior!"

And Harold Dare and the beautiful maiden went forth to a new day, of brighter dreams and a finer chop suey.

THE END

The Super Velocitor

By S. C. CARPENTER

(Illustration by Blythe)

Puzzled, Crane approached the car for a closer inspection. The two on the front seat were looking straight before them. One of those on the rear seat had her lips partly opened as if speaking, but there was not the faintest motion.

THE SUPER VELOCITOR

SUPERINTENDENT HAMILTON reached for his telephone— "This is Conductor Burton, of No. 28, speaking from Bradford. The mail car was robbed somewhere between here and Ridgedale. Registered mail gone. Am holding car for your orders."

"Sidetrack and guard the car," came the order: "Call the Bradford police. I will be right over on No. 31."

Superintendent Hamilton banged the receiver at the hook and glared at the offending telephone. The third mail robbery in two months, and neither local police, railroad detectives, nor the postoffice inspectors had found a single clue?

B. C. CARPENTER

No. 28 was a fast mail, making only two stops in the run from Ridgedale to Bradford. Registered mail placed on the train at Ridgedale had somehow vanished into thin air before reaching Bradford. At neither of the two intermediate stops had the Bradford mail been handled by the clerks, and the train had pounded out her average of fifty miles an hour between stops with not even a slow-up. After the first robbery, a mail clerk had been arrested as the only one who could possibly have handled the mail. At the second robbery the clerk alternating with him was in charge of the car. Pursuing their thought that the mail clerks must be the culprits, the inspectors arrested him as the perpetrator of the second theft and a possible accomplice in the first.

Thus it stood when Hamilton reached Bradford, where he found the mail car sidetracked and the police on guard. He was greeted rather brusquely by the inspector in charge:

"Isn't it a rather high-handed proceeding to order the United States mail held up? I have taken the responsibility of forwarding the mail, transferring it under police inspection. I am confident no clues were destroyed by so doing."

"Have you found anything?"

"The car, itself, is being examined now; but so far we have found not a scrap of evidence except a bit of mud on the side sill, as though someone had climbed into the car with muddy feet."

"That may help."

"Maybe. Maybe not."

After a consultation between Hamilton, the inspector and the police, the clerk, who had been put through a severe grilling, was released. The other two clerks also were exonerated; as they were obviously innocent of the series of robberies.

Perplexed and not a little disturbed over the situation, Hamilton returned to his office. By the time he reached his desk his decision was made. "There is only one man who can handle our end of this case—Detective Crane, of New York." A telegram was promptly sent and a reply as promptly received. Two days later Detective Crane walked into Superintendent Hamilton's office.

"I've heard of you, Mr. Crane, and believe that with your wide experience you can help us out on a mighty tough proposition."

"I'll be glad to do what I can, but cut out the 'Mr.' To most of my friends, I'm just Crane."

"All right, Crane," laughed Hamilton, "we'll get down to business."

Crane Enters the Case

HAMILTON went over the situation briefly, but there was little he could really tell. For some time Crane stared thoughtfully at the floor. "Now let's sum up. Three times your mail car has been robbed. In every one of the three robberies there has been a specially valuable shipment. Mail clerks arrested with no effect on robberies. No one entered the car who didn't belong there, and no chance between stations to board train. Absolutely no clues except a bit of mud. That sums it up?"

"Just about. I can think of nothing else."

"All right. Now let's get a little more detailed information on these points. Exactly what were these valuable shipments?"

"All I know is that the registered mail was unusually heavy."

"Did you know, beforehand, this heavy mail was coming?"

"No."

"Humph! And the robbers did. Something funny there. Any spe-

IF we do not miss our guess, the present story will arouse more than a usual tempest of correspondence from our readers.

And, yet, the theory contained in this story is based upon excellent science which, incredible as it may seem at first, is nevertheless within the strict bounds of possibility.

It is well-known to science that under certain stresses, emotional and otherwise, men have often lived years during a few measured minutes.

During the war, for instance, men have performed deeds of speed and strength that they never would be capable of doing under normal conditions.

It is also well-known that certain drugs will produce psychological changes in our reactions to the world for a short time that could never be accomplished normally. Maniacs have also even exhibited strength of superhuman character.

All of these examples simply show the physiological speeding-up of the human engine, and it is conceivable that by using entirely new methods this speeding-up process could be enhanced greatly—at least for short periods of time—without disastrous results to the human system.

You will find this story tremendously interesting as well as thought-provoking.

cial guards?"

"No."

"And with two robberies, one after the other, you mean to say you took no special precautions against a third?"

"Well, both clerks were in jail and they brought another from a distant division. The first two might have been in it, together, but hardly the third, who was on the car at the last robbery."

"That may be true. Got the men shadowed?"

"No. They have all been transferred to other divisions."

"How about the car, itself? What type is it, blind ends?"

"It's an older-type car, platform and doors at each end."

"Doors locked?"

"No. The end doors were unlocked and on the trip when the last robbery occurred the clerk says the side doors were open for ventilation. It was a hot day."

"And that's the trip when you found the mud on the side sill?"

"Yes."

"How about that mud? Find where it came from?"

"It's been analyzed by a chemist and several geologists have examined it. All agree it is a common clay that occurs all through this section. It might have come from anywhere."

"Clerks didn't have mud on their shoes, did they?"

"No. And they all swore up and down that no one entered the car who didn't have a right to be there. There were no stops between stations and, anyway, an outside gang couldn't hold up the car without some show of force."

"No? Well, apparently, they did. And now, then, when is the next robbery coming off?"

"When is the—WHAT?"

"Well," laughed Crane, "let's put it this way: when is the next big shipment due? The next robbery will occur right then."

"If they stick to schedule, there won't be another for a month; but in two weeks the First National Bank of Ridgedale will make a special shipment of money. They will furnish their own guard."

"Good! Can you get the chief of police over here?"

"Yes. I'll call him now."

Fifteen minutes later the chief had arrived and the introductions were over. "Now, chief, I have evidently pumped Superintendent Hamilton dry, but there are a few little points which maybe you can clear up."

"Fire ahead."

"Besides the mail clerks, is there anyone you can think of who could have had any possible connection with the robberies?"

"No. In the two months since the first affair we have thoroughly investigated everyone who had anything to do with that car and cannot find a shred of evidence. It's the most mystifying case I ever heard of. Three times that car has been robbed in broad daylight. How?"

"That's what I'm here to find out, chief. Assume, for the moment, that one of the clerks is guilty. In at least one case the side doors of the car were open. It would be a simple matter to toss a package through the doorway to a confederate at some point along the right of way. Can you think of anyone who could have been that confederate? Now think carefully, chief. Valuables like that don't disappear into the underworld without showing up again, somewhere."

Brows knitted in thought, the chief drummed with his fingers on the desk. "I have it! 'Spider' Morgan."

"And who, may I ask, is 'Spider' Morgan?"

"He is a budding young crook who bids fair to become an expert if he keeps on. We have had him up several times, for petty thefts. For the past two or three weeks he has been specially flush with money; but, as he hasn't pulled off a job for some time, we have nothing to hold him on. We have, however, kept an eye on him, though he is not being actually shadowed. He could not have been connected with the last robbery, anyway."

"Why not?"

"Because he was somewhere in the city at the time."

"What do you mean—'somewhere in the city?' Don't you know exactly where he was?"

"We know his whereabouts except for one interval of about half an hour."

"What time was that?"

"Between 11.00 and 11.30."

"Where was the train at that time, Hamilton?"

"Left here on time, at 11.02. Reached Bradford on time, at 11.40."

"Where was Spider at 11.00? Near the station?"

"No. In a billiard parlor a mile away."

"Humph! That certainly lets him out from actual participation in the robbery. And we don't know that it actually occurred between here and Bradford. But—'Spider' disappears at the same time the train leaves the city. It may be sheer coincidence—probably is, but the question of his whereabouts is worth investigating. Yes, I have a hunch that Mr. 'Spider' Morgan will bear watching.

"Now, chief, I have a plan and I want your help. When the First National makes its shipment two weeks from now, I am going on the car with it. Meanwhile, I should like to have you put a shadow on 'Spider'. Start now and hold him day and night, till I give the word to let go."

"O. K., Mr. Crane. We'll do it."

"And you, Hamilton, I'll depend on you to make arrangements with the First National to have me go with the shipment."

And in this commonplace manner was started the most amazing case Detective Crane had ever encountered.

CHAPTER II

The Fourth Robbery

TWO weeks later No. 28 left Ridgedale for Bradford, with Detective Crane in the express car. By agreement with the police chief, known only to the latter and Detective Crane, to prevent any possibility of leakage, arrangements were made with the bank, at the very last moment before train time, to ship the money in an ordinary day coach of the following train, an "accommodation." Several plain-clothes men were scattered through the car. A bogus package, with marked bills, was carried from the bank under guard and placed in the safe of the express car. Crane, known to the clerks in the car as the bank messenger, was given the combination of the safe and full authority to take any measures he saw fit.

He decided to take no chances. As the train pulled out of Ridgedale, he opened the safe and personally inspected the package. It had certainly not been tampered with at the beginning of the journey. During the short run to the first stop, the express and mail clerks approached the safe only under the watchful eyes of Crane; and he again opened the safe as the train left the station. The package was still intact. The same precautions were taken on the run to Riverside, as during the first part of the trip. Riverside was the last stop before Bradford, and Crane felt that the crisis was approaching. At the station he kept his eyes on the package all the time the safe was open and felt a distinct relief as the door clanged shut.

The train swung out across the switches and he opened the door for his usual inspection. The next stop was Bradford and he knew they would make an average speed of fifty miles an hour till the end of the run. Leaving the safe door open, he sat down on a box and looked at the package. The danger points of the two stations were pasaed and nothing had happened. The theory of tossing the package out of the door to a confederate could neither be proved nor disproved while he was in the car; but it had been only a surmise on his part and he hardly felt it was the right solution.

What other solutions remained? Since the train had not been held up to perpetrate the robberies, Crane was at a loss to proceed for further light on the mystery. Settling back on the box he leaned against the side of the car, near the open door, letting the cool wind blow across his forehead. The tension was over and he began to relax. Glancing around the car he noted that the clerks were busy at one end. Again fixing his eyes on the package, he thought to himself that the whole elaborate plan had been for nothing. The trap had failed to spring and he was no nearer a solution. But suddenly, with eyes literally bulging with amazement, he stared at the safe. *The package was gone!*

With the train thundering along at sixty miles an hour, no one near the safe but himself, it had literally vanished in the wink of an eye. One second it was there. The next instant—gone! Before his very eyes the fourth robbery had occurred, and he knew no more of what happened than he did about the other side of the moon!

In one jump he reached the safe, pulling the signal cord to stop the train as he leaped. Carefully, methodically, he examined the safe and the whole surrounding region of the car. The package had vanished as though it had never existed. By this time the train had ground its wheels to a stop, and the crew were running forward. Swiftly Crane gave his orders. Two men climbed to the roof and searched the train from engine to tail lights, poking into the overhang of the ventilators and peering down between the cars. Two more went through the cars, searching aisles, seats and vestibules and calming the nervous passengers. Crane and the conductor, starting at the cowcatcher, searched the engine and running gear of the train. Then, joined by the rest of the crew, they combed the track and adjoining ground for fully half a mile behind. Exactly what Crane expected to find by this performance wasn't quite clear, even to himself, but he didn't find it. Finally, calling in the flagman who had gone back when the train stopped, the "highball" was given and the interrupted trip resumed.

The Mystery Grows

FOUR men were gathered in the office of the chief of police; they were the chief himself, Hamilton, Crane and Post Office Inspector Saunders, who had been following "Spider" Morgan. Crane felt the tension in the air. Hamilton looked at him coldly, but the only remark he made was: "It's a good thing we sent the money on the local. It got through." The chief was sizing him up with a cool, level gaze and Crane could feel his scorn for the "famous detective" who had allowed a robbery to occur under his very nose.

The chief's voice snapped through the tense stillness: "Well, Crane, out with it."

Crane told his story from start to finish without interruption. When he ended the chief's eyes were snapping. Suddenly he darted his finger straight at Crane. "If it wasn't for your well-known reputation, young man, I should say you had been asleep. Inspector Saunders, would you enlighten us by telling what you have found?"

"Yesterday morning 'Spider' Morgan didn't leave his lodging house till ten o'clock. He went to a cheap lunch room and took his time about breakfast. When he finished, he walked leisurely across the city to Sullivan Park and hung around there till a man came along in a car and picked him up."

"What time was that?"

"A couple of minutes before 11.00." The chief and Hamilton glanced at each other.

"I expected, from what information you gave me, chief, that I might have to make a run for it; so I had a car with me. It was a powerful car, but I had the time of my life keeping behind 'Spider,' even though I let her out, good and plenty. They went

straight back into the hills and, from the start, maintained a fifty-mile speed. They were heading up for that range of hills that runs between here and Bradford, and stopped at an old deserted farmhouse on Panther Mountain."

"Just a minutes," broke in Crane: "How far is this Panther Mountain farmhouse from the railroad?"

"It's ten miles from the point where the train was robbed," snapped the chief, "so you can cut 'Spider' Morgan out of your calculations."

"Both men went into the house," continued Saunders. "I timed them and it was exactly 11.10. Ten minutes later they came out with another man. All three got in the car and started back here. They dropped 'Spider' at the Park and he made straight for a lunch room. I was hungry, myself and went in right behind him. He handed a bill to the cashier. It was a large one and she couldn't change it. She showed it to me, as I was right behind 'Spider', and asked if I could. I changed it for her and——"

"Go on."

"Here it is."

The chief took the bill and glanced at it. Then his jaw dropped. *It was a marked bill from the bogus package!*

Like a burst of machine-gun fire, came a rain of questions from the chief, striving, with all the skill of the trained inquisitor, to penetrate the minds of the two men and get to the bottom of their stories. Through the sledge-hammer blows of his inquiry they stuck to their guns. Finally, from sheer exhaustion, he stopped.

Slowly, the incredible truth filtered into their minds. During the ten-minute interval while the suspects were in the farmhouse, the train, ten miles away and running at top speed, had been robbed! And "Spider" Morgan had left the house with part of the loot in his possession!

Hamilton was the first to break the tense silence. With a look of awe, almost of fear in his eyes, he gripped his chair till the knuckles went white. "My God! What kind of an infernally hellish combination are we up against, anyway?"

The four men stared from one to the other. Finally Crane rose, shaking himself as if to break a spell: "The only way to fight that combination," he said slowly, "is from the inside."

A few days later "Spider" Morgan was arrested and given a ten-day sentence for vagrancy; not a word was said about the robberies. He was thrown into a cell with a dirty, miserable bum for a cellmate. It was no new experience for "Spider" and the bum was evidently enjoying his chance to sleep in the peace and quietude of the jail. For some hours "Spider" regarded his sleeping companion thoughtfully, but after administering a few tentative kicks in the ribs he gave up his overtures at companionship as a bad job. Throughout the next day and the rest of the ten-day term it was the same. When the bum wasn't sleeping he wasn't talking, either. In spite of all "Spider's" attempts at conversation, he elicited nothing but an occasional grunt or monosyllable. When his release came, he felt he had never had so uncommunicative a cellmate in all his prison experience.

The day after "Spider" took the air, the bum was also released. His dirty, ragged possessions, such as they were, had been returned to him and he stood at the gate, an unkempt figure, sullenly eyeing the passersby. Finally, with an inarticulate grunt, he jerked his cap down over his eyes and slunk down the street. And no one could have recognized that slouching figure as Detective Crane!

For many days, several weeks in fact, no word was received from Crane. Then, by some mysterious means of underworld communication, he got through to Hamilton a message that he was making progress, but was being constantly watched and it was very difficult to communicate.

A few days later, as Hamilton walked back to his office from lunch, a rough-looking man accosted him. "Gimme a quarter, Mister, I'm starvin'." Hamilton ignored him, but the man persisted and finally became such a nuisance that Hamilton called an officer, who led him away, protesting and threating.

Early in the afternoon Hamilton lifted his telephone receiver and found the chief, himself, on the wire.

"That man you had arrested this noon insists on seeing you."

"I don't want to see him, chief, I'm pretty busy; but seeing it's you, I'll come over."

On arriving at the jail the man greeted him with this astonishing piece of information: " 'Spider' says I'm the stupidest pal he ever had." Hamilton stared at him angrily, then—"By Jove, if it——' With a quick motion to his lips the man silenced him, and the chief caught on. Motioning the guard to withdraw, he led the way to his own private office.

Sinking into a chair the man wearily drew his hand across his forehead. The chief stepped to a cabinet and got some brandy: "Here, drink this, Crane, you're all in."

"Thanks, chief. That's better. I've been leading a dog's life, but I think it's worth it. We're up against something big. Don't ask me what it is—I don't know. It seems, as we expected, that 'Spider' is a member of a gang. The head of this gang is known to the members only as 'The Boss'. No one knows who he is or anything about him. 'Spider' says they rarely see him, unless a job is being pulled off. Then he takes personal charge.

"The first thing I did, after leaving the jail, was to look up 'Spider.' Told him I was a stranger here. Been kicked off a freight train and landed in the cell where he found me. He took me in charge right away and we have been good pals ever since. About three weeks ago he persuaded 'The Boss' to accept me as a member of the gang. I kicked. Said train robberies were not in my line. But he laughed and said it was a dead cinch the way the gang pulled 'em

off. When I asked him why, he shut up. Said there was some secret about it. No one knew but 'The Boss'. The members of the gang know only enough to make them work together. Anyway," and Crane laughed for the first time, "he says 'The Boss' wants me in the gang because I can keep my mouth shut. 'Spider' says I'll fit in right there, as I'm the stupidest pal he ever had.

"It's about time we roped 'em in. 'The Boss' smelled a rat when 'Spider' was arrested after the last robbery and that's why they have been laying low; but I think he's only waiting now for another good haul. I suggest we bait a trap with something he can't resist. Stage a shipment of diamonds from some jewelry firm. Suit yourself about whether they are real or paste."

"Well," laughed the chief, "if you are in the car, I'll make 'em paste."

"So be it. As a member of the gang, I'll take part in the robbery. It's up to you, chief, to cover us and nab the whole gang on a signal from me. And say, Hamilton, I owe you an apology."

"Cut it out. I understand, perfectly."

"You don't know the half of it. It seems a would-be member of the gang is under constant scrutiny till he proves himself in the first hold-up. That's the only way I could get to you and avoid suspicion. 'The Boss' is running no chances, I tell you."

CHAPTER III

"The Boss"

As the train pulled out of Ridgedale with the shipment of diamonds, three men left Sullivan Park in an auto, and took the road leading into the hills. The three men were Crane, "Spider" Morgan and a man whom Crane now knew as "Bud" Hanson, an expert safe cracker. Crane looked off across the city to a trail of smoke floating up from the horizon. The mail train was pounding out through the yards on the final stretch of its run and gaining speed with every puff of the big locomotive.

"What's de game, 'Spider'? Thought we was after the mail train. Ain't dat it, down dere? Job musta been called off."

"Called off, nothin'. We're just playin' wid dat train like a cat does wid a mouse."

"Humph! Guess it'll take some cat to catch dat mouse."

"Don't youse fret, Bo. Youse ain't seen nothin' yet."

Little more was said as the auto climbed the road that wound up through the hills. Finally the road emerged from the woods into a clearing, and the auto pulled up at an old, deserted farmhouse. This must be the Panther Mountain farm that Saunders had mentioned, Crane thought. The car was left in the weed-grown driveway and the men entered the house.

As they entered, a man stepped forward to meet them, a man whose whole manner and personality aroused Crane's immediate interest. For, though "Spider" and Hanson were typical underworld toughs, "The Boss" showed every evidence of culture, refinement and keen intelligence. And such a man, with a criminal twist to his brain, Crane knew is a dangerous antagonist, indeed.

"We have plenty of work ahead of us and I shan't waste words," he said, addressing Crane. "You are here to join the band. No man joins this band without fair warning and a chance—just one—to back out, if he wishes. As a member of the band, nothing you hear, see or feel must be divulged to an outsider. A new member is told nothing in advance. He must find out for himself. The real secret behind this band is known only to me. Once a member, you remain one. You leave it afterward under penalty of certain death. And now"—he pointed to the door—"if you do not wish to accept these terms you are absolutely free to walk out that door and go. Decide!"

"Phew," thought Crane to himself: "I'm letting myself in for more than I bargained for. This 'Boss' must be infernally sure of himself to let me walk out that door scot free after what has already been divulged. All the more reason for getting at the bottom of this mystery—"

"I'll join," he said curtly.

"The Boss" turned to "Spider" and nodded. "Spider" and his companions left the room, returning immediately with four curious contrivances; they were metal cylinders, or tanks, each roughly a foot in diameter by two and a half feet long. Attached to each tank was a sort of harness of metal straps, ending in a mask which could be put over the face.

Each tank was securely fastened to the back of one of the men, like a pack, the cylinder standing vertically between the shoulder blades. At first glance Crane thought they were filled with compressed air, or gas, possibly a form of oxygen tank for opening the safe; but, as his own tank settled into place against his back, it felt heavy; as though it contained machinery. The weight was taken by two straps curving over the shoulders and connecting in front with a horizontal band passing around the chest just under the arms. The top of the tank, just back of the head, was connected to a band which closely encircled the forehead, and the mask fitted snugly over his head; these connections were flexible, so the head could be moved freely in any direction. The lower end of the tank, similarly, was connected with a band encircling the waist. The whole thing, though a little heavy, was easy to carry.

Motioning "Spider" to follow him, "The Boss" stepped into the next room. A couple of minutes later he appeared in the door and beckoned Hanson, for all the world like a doctor summoning patients. Then Crane was called. As he entered the room he noted that "Spider" and Hanson had disappeared, having probably left the room through another door which opened into the hall. In a recess in the wall he saw a small panel, like an electric switchboard;

on this panel were dials, a controller handle and two electric cords several feet long.

Seating Crane in a chair "The Boss" plugged one of the cords into the machine on his back. Then he slowly started to move the controller handle, but Crane never saw the finish of the movement. A sudden wave of deadly nausea swept over him; his brain whirled giddily and his stomach felt as though he were falling through an elevator shaft at a thousand feet a second. Finally the agony passed, and was followed by a high-pitched humming. This, in turn, quieted down to an almost imperceptible buzzing in his ears.

"Feeling better?" He came to his senses to find "The Boss" disconnecting the cord from his own tank. "All right, we'll go."

Leaving the house they joined the other two men in the yard. Immediately a bewildering variety of conflicting impressions forced themselves on Crane's attention. First, to his intense surprise, they ignored their own car and started off down the road on foot, "The Boss" in the lead. As they tramped along he was still pondering this strange behavior of the gang when he began to notice another puzzling fact. It was hard to walk; the slightest movement was impeded, as if by a dense medium. He felt as if he were trying to walk under water. Close on the heels of this came a third impression—this time a feeling of uneasiness, a very familiar uneasiness. Glancing quickly at the sky, he noted the narrow strip between the trees was clear and blue; but, looking around him at the trees, he understood. When the men entered the house a few minutes before, a gale had been blowing; but now not a leaf stirred. The woods, the whole of nature, seemed suddenly quiet in that ominous stillness that precedes a storm, and he knew a thunderstorm in these hills was something to remember. The blue sky meant nothing. Thunderheads could be rushing down upon them and might not be seen in these woods till directly overhead. "Guess we're in for it this time," he said to himself.

A Mysterious Murder

BUT this walk was a poser! "That 'Boss' is sure a wise guy," Crane thought: "He believes in confusing the scent by pulling the job a different way each time. The last robbery was, evidently, engineered directly from the farmhouse, itself; how I canot imagine. And now, just by way of variety, we are walking to it! Of all the puzzling cases I ever ran up against this is certainly the ace." Hurrying a little he ranged up alongside of "Spider".

"What's de big idea in de hike, 'Spider'? 'The Boss' surely don't expect to catch that train by walking! Why don't we take the auto?"

"Auto! Holy mackerel, hear the man! Auto is it? Look ahead of youse."

"Well, yes, I see a touring car standing in the road up there. Probably a breakdown. What's dat got to do with it?"

"Guess youse ain't blind, at any rate, if youse can see it; but youse don't see the half of it, Bo." And not another word would he utter as they tramped the half mile separating them from the stalled car ahead.

And suddenly Crane's detective instincts roused themselves. Where were his wits? His brain hadn't seemed to be working right since they left the house. The uncanny stillness of everything in Nature was getting on his nerves. He would see the game through in his rôle of train robber; but, at the same time, he must keep his eyes open for every scrap of evidence he could get. And a very important piece of evidence was taking shape right now.

"The Boss" was well ahead of the party and almost to the auto. Was he stark crazy to ignore the four witnesses in that car—witnesses who could not fail to remember the group of men who passed them with such strange contrivances on their backs? As he noted the number of the car, Crane also noted something else. "The Boss" stepped to the side of the car, bent over and looked at the instrument board. And not one of the group so much as glanced at him!

Waiting till the rest of the men came up, "The Boss" remarked to Crane: "That chap is reeling off forty miles an hour"; but the detective barely heard the words. He was staring in astonishment at the car and its occupants. On the front seat were a young man and a girl, on the rear seat two girls, and all four were fixed and motionless as wax figures. "Dead" was the first thought that flashed into his mind. He glanced at the Boss, who regarded him with a quizzical smile. Again he looked at the silent, motionless forms in the car. In his long detective career he was familiar with death in many guises and *that* was not death. The happy laugh on the lips of the girl in the front seat, the glow of color in the faces of all four, could be nothing but abounding life and vitality. Something wrong here, surely. For the life of him, he could not define the feeling, but he felt something strangely uncanny, unnatural about the whole thing.

Puzzled, nonplussed and more than a little awed, Crane approached the car for a closer inspection. The two on the front seat were looking straight before them. The two on the rear seat were turned toward each other, one with her lips partly open as if speaking, but a prolonged, close examination revealed not the faintest sign of motion, breathing, nor the flicker of an eyelid. Slowly he reached over and touched the hand of the girl nearest him. The fingers were flexible and the flesh warm. He passed his hand before her open eyes. No response. His glance wandered over the interior of the car and rested on the speedometer. The pointer was at 40 and a shade more. Humph! Speedometer out of commission. From sheer professional force of habit he walked around the car, taking in every detail. Something, he couldn't quite understand what, caught his attention and he stopped for a closer look at the front wheel. Then he sighted across

the tire to a spot of dirt on the mud guard. The wheel WAS MOVING! Very slowly, but steadily and surely, the top of the tire crept forward. Glancing quickly up and down the road he saw the auto was moving up hill. He placed his hand, then his ear, to the hood. The engine was not running.

Turning in incredulous amazement to "The Boss," he found him standing squarely in front of the auto, one foot on the fender and leaning forward with both elbows on top of the radiator. "Yes, this car is making all of forty miles an hour, and when you have fully observed the phenomena of wheels going around, kindly get a move on, yourself! Come now, snap out of it!"

As a member of the gang, Crane was supposed to obey "The Boss." As a detective, it was his duty to find some clue to the meaning of this strange occurrence. "The Boss" had already turned away and expected him to follow. It was a time for quick thinking and quick action.

Was the strange condition of this party due to natural causes or was it a sham? Natural causes seemed out of the question. One person might possibly have a fit or trance or something, but hardly four at once! Sham had a shade more reason on its side. "The Boss" showed no surprise at the situation; in fact, he appeared to expect it. As "The Boss" was connected with the robberies, anything connected with "The Boss", even remotely, must be investigated. These people might even be members of the gang, unknown to him, and the whole thing a fool stunt to "get the nerve" of a new man. Well, he'd wake that bunch out of their tomfool tableau in short order!

Quick as a flash his hand shot out, just grazing the wide-open eyes of the girl in front of him. Not by the flicker of an eyelash did they move. Quickly he placed his hand over her heart. With a grim suspicion changing to certainty, he carefully felt for the exact spot and waited. The flesh was warm, but under his hand he felt no beating! With deft quickness he examined the other three. "Dead, all four, and very recently. 'The Boss knows something about this."

Hand flashing to his gun, he whirled: "Hands up!" But the rest of the party were far ahead.

Cursing himself for a premature and foolhardy act that, by the grace of Providence, had miscarried, he replaced his gun and strode after the others. Never, in all his experience, had he been compelled to leave the scene of a crime without a thorough investigation; but the explanation lay with "The Boss" and "The Boss" he would follow. If his self-control could be kept, and no more fool breaks were made, this was the last holdup.

Controlling himself with a great effort, he tramped along with the rest, trying to appear unconcerned, but his mind was racing. What was the meaning of this whole, mysterious affair? Rapidly he went over the evidence, to date, tabulating the main items in his mind and trying to find some tangible thread on which to string them:

The mail clerks arrested and released;

The mud on the sill of the car;

The mysterious vanishing of the package in the fourth robbery;

The ten-minute interval at the farmhouse;

Finding the marked bill on "Spider";

The machines strapped to the members of the party;

Leaving the house on foot to meet a train miles away;

The auto murders.

CHAPTER IV

The Case of a Fly

EXACTLY how were these bits of evidence connected with a solution of the mysterious robberies? He couldn't find a single theory to which he could follow even two of these clues, not to say the whole eight! To be sure, he was actually on the way, in person, to a solution of the mystery; but his active mind refused to let go of the problem.

(1) How were the three mail clerks connected with it? Simply, so far as he could see, because they were the only persons in reach of the mail at the time. Assuming that the first clerk had committed the first robbery, he was safely in jail at the time of the second. The second clerk had handled the car on alternate days with the first, and therefore there was a chance of collusion between the two; the second man had simply carried on when the first was arrested. This theory, however, was knocked to smithereens by the fact that the third robbery of the series had occurred with both men in jail, and under another clerk brought in from a distant division, with no possibility of his being in collusion with the other two or with the gang. All three men had been transferred to other divisions on their release, and the fourth robbery had occurred despite everything. Obviously the clerks were innocent, and had no association with the gang.

(2) How about the mud on the door sill? The police had agreed, without exception, that the mud had been scraped off against the sill from a shoe. Several geologists had examined the mud; it was a clay found very frequently along the whole division and no clue was given as to its locality. The clerk had not seen it at all and it seemed probable that it came from the foot of one of the men loading mail or express at one of the stations.

(3) The mysterious vanishing of the package in the fourth robbery, right under his very nose, simply had him guessing. It had literally vanished as a light does when the lamp is switched off.

(4) And the gang had been at the farmhouse only ten minutes. A careful comparison of time between Saunders and the train conductor had established the fact that the train had been robbed during this ten-minute interval. But it was also known, as an absolute certainty, that not a man had been seen leaving the house, from the time they reached it, to

the time they left it and returned to the city.

(5) And yet a bill that had been, indisputably, in the package on the train, ten miles away when "Spider" Morgan went into that house, was on his person when he left it, ten minutes later.

(6) As to the machine that each man carried on his back, that, at least, could be explained with some plausibility. The mechanism and its actual purpose was wholly a mystery; but it was plainly intended for some use during the robbery. The power had been started by connecting with the switchboard before leaving, evidently the only way to do it. A wise precaution, Crane thought, to prevent possible tampering by the men. That horrible jolt to his stomach was simply the effect of vibration; at a certain critical speed the machine had trembled violently and shaken him with it. The machine was now running to pump up pressure, or charge batteries for use on the train. He only wished the whole problem was as easy of solution as the machines!

(7) On the train? Well, they certainly were never going to get aboard that train by walking to it; that was dead sure. It had pulled out of the yards at Ridgedale as they left Sullivan Park, and its fast schedule was maintained till the end of the run. And yet "Spider" had said they were playing with the trains like a cat with a mouse. They had a safe cracker with them, as though he were intended to be on the car, in person; and the sole purpose of this expedition, so far as he knew, was to board and rob that particular train.

Also, a curious feature of this walk was the resistance he encountered. The most nearly reasonable explanation he could think of was some peculiar atmospheric condition; though the storm had failed to materialize. A thought did flash into his mind that the machine on his back might have a gyroscopic action which, with the complex movement of walking, made it difficult to move. But this failed to explain the distinct feeling of pressure against his body.

(8) And the quadruple murder, if it was a murder, in the car? His lips set grimly. "The Boss" could explain that murder when the chief began to sweat facts from him! It had, obviously, nothing to do with the robberies. It was simply an individual crime, a problem by itself. And Hamilton was right! What a devilish mess they were up against?

With a great effort he brought his mind back from its wanderings and focused his attention on a peculiar object in front of his face. The object, in itself, was by no means peculiar. It was simply an ordinary, everyday fly, one of the numerous species that make life miserable for the housewife. Yet Crane stared at it as if he had never seen a fly in his life. Bringing his acute faculties to bear on this miniature problem that had literally popped out of the air, he noted that the insect appeared to be suspended motionless in space—no ordinary position for even a fly. Then as he observed it more carefully he noted that it was making headway across the road, from which brilliant observations he deduced the not unreasonable assumption that the creature was actually flying. Yet, in all his born days, he had never seen a fly actually on the wing taking life quite so leisurely as this one. He grinned as the thought struck him that an ant, crawling across the road in the same direction, could give this fly odds and beat it! It was a relief to find a problem, even for a moment, that had nothing to do with those infernal robberies. And this fly certainly had no ——. *What was that?* Deep in the recesses of his consciousness a thought stirred. *"That fly solves the problem!*

What nonsense was this? The thought persisted gradually taking a little clearer form.

"In the actions of that fly you have the solution to the whole problem."

The Robbery

CONFOUND that hot sun! The band pressing into his forehead was driving him crazy. A fly solving the problem of the train robberies! Stark, idiotic nonsense! No! Why couldn't he think? His brain was whirling. A vague, intangible idea was constantly eluding his grasp. Dimly he began to perceive a something, a sinister something he could not define.

Then it came. Out of the chaos of his whirling thoughts, slowly the grim form advanced. Instinct, reason, common sense, all combined to fight back the intruder. Incredibly grotesque, utterly alien to all known human experience, the answer to the problem pounded, pounded, pounded at his tortured mind, beating, smashing its way into his consciousness. Then the unearthly, devilish ingenuity of the whole scheme, with all its hideous menace to society, blazed into his brain.

In spite of his iron nerve, his physical senses gave way in a reeling panic of terror. Staggering like a drunken man, he lurched on. His face under the mask took on the frenzy of fear; with eyes tightly shut, he swayed dizzily. Gradually he calmed enough to stop and force his reason to take command. Then he ventured on, slowly regaining strength and self-control as he started after the other men, already some distance away.

Finally he was able to face the matter more calmly. The solution was incredible, impossible, but like all other incredible solutions in his career, the acid test must be—did it give a complete and satisfactory explanation of every element in the problem? Carefully he went over all the points again. Did it clear the three mail clerks? Absolutely. Did it explain the mud? Yes. Point after point was completely cleared. Link after link dropped into its proper place in the chain of evidence. There were a few gaps; but these gaps would be filled and he knew the links that filled them.

"And," he said to himself with a sheepish grin, "no wonder 'The Boss' was enjoying himself at the auto. I was never so fooled in my life. It even solves the quadruple murder!"

"Say you, back there"—"The Boss," himself, was

striding back toward him— "This is no scenic tour. Wake up!"

Rounding a curve a short distance further on, they were confronted with the familiar sign "Look out for the engine." "Now," said "The Boss" to Crane, "We'll go through the air. I'm running no chances of leaving footprints. The train is only about two miles further on, if my calculations are correct; and on this down grade she is hitting sixty miles an hour. Press this button on the tank and up you go. Press that one and you come down."

Crane did as he was told, and to his amazement, his feet lifted from the ground and he began floating through the air in the direction of the train. The other members of the gang were ahead of him, floating like great birds.

Soon they saw the end of the train ahead of them and stopped at the rear platform of the last car. Crane, though he knew by this time what to expect, could not repress a feeling of amazement as he looked along the length of the ten cars toward the engine. The fireman had just put on coal and the smoke, hanging motionless above the roofs of the cars, looked curiously like a roll of dirty cotton laid along the top of the train. Even at the smoke stack, where he knew the smoke should have been pouring through into the air, there was little perceptible movement of the black smudge. Just a faint, slow heaving, like the almost gentle upboil of a thunderhead.

With one foot on the rear step, "The Boss" gave his orders: "We haven't pulled a job for some time, so we'll make up for it by taking in the passengers. And you," he pointed to Crane, "this trip you are merely to watch. You'll get your share, just the same. Now, men, go to it."

And go to it they did! In the train was the same uncanny, deathlike stillness as in the auto. "Spider" took one side of the aisle and "Bud" the other, and they made a clean sweep. Watches and pocketbooks were easy, but rings and necklaces were a little harder. Some of the rings came off with difficulty; but all eventually found their way into the capacious pockets of the gang. Many a time they stopped to cut the strands of a necklace from the shoulders of some unsuspecting woman. Even the hand-baggage was searched and when pockets became filled, a few roomy bags were requisitioned, the contents being cooly dumped outside the train. Crane, helpless and inwardly boiling with rage, was forced to look on. He had never imagined such high-handed, free and easy looting was possible.

When they reached the express car, they simply walked in at the end door; "Bud" opened the safe with the dial, and they cleaned it out. Then the gang hunted through the express matter for anything worth taking, relieved the clerks of their valuables and went out through the side doors.

The fifth robbery in the series had taken place—and it was a complete success.

The trip back to the farmhouse was uneventful. Here the procedure was reversed, each man going in to the panel room and having the power turned off the machine. Crane helped them put the loot into the auto, incidentally taking note of the fact that a gentle breeze was once more blowing through the trees. As the men got into the car he hung back a little. "The Boss" was leaning forward shifting the gears, the other two men were busy stowing the loot.

"Hands up!" Crane poked a revolver into "The Boss's" ribs. "Hands up," echoed from the bushes on both sides of the road.

Crane was hurled sprawling as the car leaped forward, taking the curve into the main road on two wheels. Down the road a big police auto slowly backed from among the trees, a literal broadside of rifle fire blazing into the robbers' car. The report of a bursting tire, half-drowned in the roar of the guns, a wild, sickening lurch—and the onrushing car nosed into the ditch, hung, for a moment, precariously balanced almost on end, then toppled over on its side.

Two figures painfully and slowly detached themselves from the wreckage, hands held high. They were promptly ironed. When "The Boss" was finally extricated, he didn't need irons.

On the way back to headquarters, Crane asked: "Well, Saunders, how long were we away from the house?"

"Away! What do you mean? You have just come out. We followed your car, as you instructed. We were near enough to see you take the car into the driveway and enter the house. Immediately we threw a cordon around the building. That was twelve minutes ago and not a person left that house till you walked out with that loot. Every man in our force can swear to that."

Crane chuckled: "And by the way, Saunders, did a car go past while we were in the house?"

"Yes! There was a man and three women in it. They were going at least forty miles an hour."

Crane gazed pensively at a cloud in the strip of blue sky above them. "Were they dead? I thought they were."

"You—what?" gasped the astounded Saunders: "Why, Crane, that blow you got from the mud guard must have upset you. They certainly weren't dead when we saw them. Not by a long shot."

Crane Explains

ONCE again the same four men were closeted in the chief's office. On the table in front of Crane lay one of the tanks.

"One of the most mysterious crimes in many years has been solved," he began, "and the greatest menace to society in the history of criminology has been nipped in the bud. If you expect a learned discourse on the scientific whys and wherefores, I fear you will be disappointed. I leave all such questions to the scientists themselves. All I can tell you is my own experience and the theory I have evolved to fit it.

"In solving a crime, gentlemen, many theories can be evolved that will fit *some* of the known facts, but the supreme test of the true theory is, does it fit *all*

the facts? The true theory will not only explain all these facts, so far as I have observed; but it can be checked and tested by events that turn up later in the case. We have had many puzzling and seemingly impossible combinations in this case, but the theory I have in mind brings them all together as neatly as do the pieces in a cut-up picture puzzle."

Rapidly and clearly he sketched an outline of the robbery, from the time the robbers' car left Sullivan Park, till it up-ended itself into the ditch on Panther Mountain. Then he carefully reviewed the whole case, bringing out all the salient points.

"The first inkling I had of the truth was while I was watching that fly—and that, by the way, is the first instance I ever heard of where the solution of a crime was revealed by watching a fly cross the road! You may or may not be aware of it, gentlemen, but some of the species of flies are the swiftest creatures on wings; and I was racking my brains to understand why this insect should be so slow. It was not hovering in mid-air, as they often do, but moving steadily forward. I could distinctly see the wings slowly moving on each side of the body and, if you have any idea of the extreme rapidity with which a fly's wings vibrate, perhaps you can imagine how astonished I was. It looked curiously like those moving pictures taken with a slow-motion camera. Gradually I began to see the reason. It seemed too vague and too incredible to grasp at first. Then, as in the burst of a star-shell, the whole truth was revealed."

He paused, looking from one to the other. The proverbial pin could have been heard to fall in the tense silence that followed his words.

"Gentlemen, that fly appeared slow to me because I, myself, *was fast!* I was thinking, feeling, moving, actually living at such a quick *tempo* that everything else was practically stationary in comparison. You can probably realize that a man who runs down criminals for a living must have nerves of steel; but I freely admit that when it fairly got into my head that I was probably moving as fast as any rifle bullet, I came as near as I ever did in my life to having a real shock."

Here he patted the cylinder in front of him. "I cannot explain it, myself. I doubt if it ever will be fully understood; but this machine, in some mysterious way, was generating electric or atomic impulses that passed through my body, the circuit probably being from the band at my forehead, through the body, to the band around the waist. To my own personal senses, everything appeared to be perfectly in proportion and normal. Nevertheless, not only were we made invisible by our terrific speed, but the impulses must have accelerated the whole intricate machinery of our life processes till they were functioning at a proportionate rate. And it is that speed, gentlemen, that explains every incident of this case. We walked because the auto would not have been affected by the impulses. The resistance I felt was due to the air pressure caused by the swift movement. The quadruple "murder" was due to the simple fact, that all told, I probably remained near that car for less than the hundredth part of a second. As was proved by my examination of the bodies, I wasn't there long enough, literally, to feel a single heart beat. And as for the people in the car, how much do you suppose they, themselves, could see, hear, feel and realize during the instantaneous flash of time that we were beside them?

"The same thing applies to the robbery—to all the robberies, in fact. The gang found the train stationary, with relation to themselves, and simply stepped on board, took their time about getting what they wanted and got off again. The whole thing was over so quickly that nothing was perceptible to those on the train.

"The mud found on the car after the third robbery was scraped from the shoe of one of the robbers, who probably climbed into the car through the side door. The reason you, Saunders, failed to see anyone leave the farmhouse was because we were totally invisible. The shock I received as the machine started was due to essentially the same cause as the sensation you perceive in a fast elevator; except that, in my case, it was greatly intensified. It even explained"—and here he smiled—"the coming storm. The trees and bushes around me appeared to be motionless with that uncanny stillness which, as you know, just precedes a heavy thunderstorm. The idea, the feeling, the impression of an approaching storm was simply a natural reaction to the appearance of this familiar condition of nature."

Again Crane placed his hand on the machine. "I fully appreciate that my explanation must sound as wild and fantastic to you as it would have sounded to me; so I shall close with a little demonstration. After that I am going to bed and sleep a week! The reaction on the physical system from the speed at which I was living, even for those few moments, is something terrible. The starting panel at the farmhouse has been thoroughly examined, as it stood, and then carefully removed from its place. There it is, over there, connected to the electric circuit in this building."

With Saunders' help he firmly fastened the machine to his back. Connecting the cord from the panel, he stood with his hand on the control lever. "I believe you have a stop watch, chief. Will you kindly time me from the instant I move this lever?"

Slowly Crane began to move the lever—and vanished. Almost instantly he reappeared in the same spot.

"Two seconds to the dot," said the chief.

Crane walked to the table and took from his pockets two watches, several rings, three pocketbooks, bills, coins, a cigar lighter, a dozen cigars and three card cases. These he placed on a newspaper which lay on the table: "There, gentlemen, you may disentangle your own property. I have finished."

Three men stared in open-mouthed wonder at the table. Then three men began frantically feeling of their own pockets. They had been robbed! Cleaned out!

Hamilton broke the amazed silence with a laugh: "And to think I anticipated something like that, and kept my hand on my watch."

"Yes," laughed Crane, "I noticed that. I had to lift your hand up to remove it."

"And where, may I ask, did that newspaper come from?" interrupted the chief.

"Oh, that! Well, after I lifted the goods from you three easy marks I spied that paper on your desk, so I sat down and read the sporting pages."

The chief, with a gasp, sank very suddenly into his chair: "And all in two seconds!"

THE END

Life In The Cosmos

(This editorial which appeared in the New York Sun of October 1 illustrates the new attitude of the world toward interplanetary matters.)

The tendency of thought among astronomical theorists today seems to be away from the nineteenth century idea of a universe swarming with worlds inhabited by intelligent beings. If life is the goal of cosmic evolution Nature appears to have been wasteful on a stupendous scale. It is impossible with the means now at the command of science to tell how many of the stars in our galaxy and other galaxies have families of planets like those that surround the sun, but if the planetesimal theory of the origin of the solar system is correct it is probable that the number of such systems is extremely small. If the material which formed the planets was torn from the parent sun by the disruptive tidal forces of a star which aeons ago chanced to pass close to the sun while both bodies were journeying through space, then the solar system may fairly be called an accident.

It is quite likely that within the solar system only the planet on which we live is capable of supporting a high form of life. The four outer planets—Jupiter, Saturn, Uranus and Neptune—may be ruled out, if for no other reason, because they are too cold. Mercury, the nearest planet to the sun, is too hot and probably it has little or no atmosphere. Only Mars and Venus remain. Mars undoubtedly has an atmosphere, though at the surface of the planet its composition approximates that of the air high above the summit of Mount Everest. Recent spectroscopic investigations indicate that the water vapor content of the Martian air is only about 5 per cent. of that of the terrestrial atmosphere. Such a rare and dry atmosphere is able to retain little heat at night. Even in the equatorial zone of Mars midnight temperatures are said to run as low as 40 degrees below zero.

Venus offers a somewhat better prospect. Although this familiar planet is so completely covered with clouds that any inhabitants it may have probably never see the sun, it is neither too hot nor too cold. The spectroscope does not show the presence of either oxygen or water vapor in its upper atmosphere, but it is believed that both exist at lower levels. It was thought for many years that Venus always turned the same face toward the sun, as the moon does toward the earth, and that therefore its day side must always be extremely hot and its night side eternally frigid. Recent measurements of temperatures on the night side, however, indicate a climate not unlike that which prevails on the earth. This would be impossible without a fairly rapid rotation. There is other evidence, however which indicates that the day on Venus is considerably longer than that on the earth.

Even in our own favored world, the only known abode of life, the margin between safety and destruction for living beings is very narrow. Dr. C. G. Abbot, the Smithsonian astronomer, calls attention to the important role that the small quantity of ozone in the upper atmosphere plays in this respect. If this ozone were brought down to earth it would form a gaseous layer only as thick as a piece of cardboard; still it serves the very useful purpose of cutting off a band of solar rays at the extreme ultra-violet end of the spectrum which, if they reached the earth, would destroy human sight and tissues by their powerful chemical activity. Yet if the ozone content of the atmosphere were slightly increased and ultra-violet light of slightly greater wave length were cut off the result would be equally disastrous, for these rays are indispensable to man.

This delicate balance, as well as all the other combinations of circumstance which makes this sphere a not unpleasant home for man, may be a bit of cosmic luck. Many persons will scorn such a term and write "purpose" in its stead. Even if astronomers knew the number of inhabited worlds between this and the remotest planet in the most distant island universe that Hubble has spied from Mount Wilson they would be no better able than the rest of us to decide whether "luck" or "purpose" was right.

The Rocket Comes to the Front Page

(*Continued from page* 601)

there is nothing that can be called impossible. What the future will bring, no one knows; but things that science-fiction writers have predicted with regard to interplanetary travel are approaching realization faster than any of us imagine. And to forestall the inevitable question of how a rocket ship is to be propelled in the vacuum of outer space, let it be repeated what the experts on rocket propulsion have stated—that the rocket attains its maximum efficiency in a vacuum where there is no air to retard the force of ejection of the exploded fuel.

In outer space the velocity possible is limited only by what the human occupants and the mechanical structure of the rocket ship can stand.

The Lost Martian

by Henry Harbers

Illustration by Flint.

To the terror of the natives, a long snake-like object stretched out from the ship toward them, at the end of which was something resembling a human hand. But it was evidently a mechanical contrivance.

THE LOST MARTIAN

ABOUT the middle of August, 1933, there occurred on the planet Mars an event which would have been very interesting to the people of the earth, could they have known it. What happened was the discovery by the Martian scientists that the radio messages which they had been receiving emanated from the earth. To Martians this was rather a momentous discovery; for it proved rather conclusively, when their scientists studied the character of the radio programs received, that there was on the earth a people following a path of evolution and civilization, similar to that of the Martians.

The discovery also settled a very interesting question. The Martians had known for some time, from what they saw through their ultra-powerful telescopes, in spite of the phases of the earth as seen from Mars, and the obscurities of its atmosphere, that some sort of civilization existed on this planet. But the Martians had been unable to tell just how civilized this world was till they heard the earth's radio broadcasts. Then the Martians could say, by comparison with the historical development of their own civilization, that the earth must have recently entered the era of radio. The type of reception was far inferior to their own and they concluded that the earth was in a stage of development that they had reached 50,000 years before.

The Martians could not, however, say just how long the earth had enjoyed radio broadcasting; notwithstanding that for many years they had tried, but failed, to detect any radio waves from the earth that could be unquestionably described as man-made. It was, in fact, only a recent discovery that enabled the Martians to separate the confusion of radio waves and static which they had long listened to, and accepted as purely natural phenomena. It is true that the Martians had for some time observed peculiar "dot-dash" modulations in radio waves coming from the earth, and there had been considerable speculations and discussion as to the nature of these waves. Some savants thought they proved that there were on the earth sentient beings communicating with each other—perhaps as an animal calls to its kind, but by means of ether waves instead of sound—while others believed these waves to be due to physical phenomena from some inanimate source on the earth.

But, with the first reception of what were unquestionably radio programs, and the permanent recording of these on the Martian reproducing sheets, there ceased to be any doubt that the theory of Martian astronomers, about what was seen through their telescopes, was true—that there were sentient beings on earth, well advanced in civilization. The Martians now recognized musical tunes, distinct languages, and all the variety of sounds familiar to radio listeners. What now interested the Martians was the interpretation of the music and languages.

It must be said, however, that the interest of the Martians in other planets was not due simply to curiosity, neither was it purely scientific interest; there was something more. Could one of us, on a certain day shortly after the great discovery was made, have been present in the great hall of the Central Martian University, where the radio waves from space were being received and their messages recorded, he would have seen an unsual meeting. Surrounding Cobal, to whom the Martians owed the greater part of the credit for the success in tuning in the earth, there was a notable gathering of persons prominent in the affairs of Mars. Among them were Tellur, the great aviator; the Princess Argene and Cromin, the High Priest of Science; all showing a strange interest in the messages coming from the earth.

The Tale of Ruthen

AT this unusual gathering, we might have heard Cobal say, after they had listened to a number of records of radio receptions: "I fear that there is no possibility of his being on Layd (the earth). Were he there, his influence would certainly have been felt, and shown by these records. For instance, he would have taught the denizens of that world some of our music, he might have introduced our language, and he surely would have used the radio to speak to us. No, there is no word from him, and their music and language shows no influence of ours. Their radio is

IT is always fascinating to contemplate the emotions of a foreigner when he pays a visit to a land with strange habits and customs beyond the level of his own people.

Conversely, it is just as interesting to have a civilized man pay a visit to a people far below its plane of civilization. Most of the things simple to him, that the stranger does, then becomes magic. Thus, for instance, when the explorer penetrates into the wilds of the Amazon, his phonograph and his motion pictures become simply super-natural things to the native.

The same thing may happen when sooner or later a visitor from inter-stellar space drops in on us and contemplates our proud civilization. For it is doubtless possible that the things that this visitor will show us will be as much magic to us as they are to the native of the Amazon jungles or the Australian bush-

The present story bears this out exceedingly well and makes interesting as well as absorbing reading from start to finish.

clearly something developed by themselves, and shows none of the influence of a Ferbian (Martian)." He paused and nodded to his hearers. His verdict must have met with agrement on the part of Tellur, the aviator, and Cromin, Science's Priest, while Princess Argene was visibly perturbed.

Our terrestrial observer would have been quite puzzled by the personal concern of the Martians over what men on earth happen to broadcast. But it happens that behind this strange concern was a stranger tale—the story of Ruthen, the lost Martian.

Some three Martian years ago, or what people on earth would call about six years, Ruthen, a descendant of a long line of great Martian inventors, the enamored of Princess Argene, and one of the most brilliant of latter-day Martian men of science, had set out to make a flight into space. His ship was a *levitator*, which could not only fly through the atmosphere like other airships, but also move off into empty space; being propelled by levitation, the force which counteracts gravitation. It was a ship upon which Ruthen and Tellur, his intimate and trusted friend, had worked for a number of years. The craft was a masterpiece of Martian engineering skill and science and symbolized the mastery of Martian man over gravitation. Its success was something not to be questioned; for the scientific knowledge of the Martians had become so great that the possibility of a blunder in designing the craft was almost unthinkable.

Thousands gathered to see the epoch-making first flight, which was to be from Mars to Deter, the name given to a strange celestial visitor, then near Mars. He could merely circle Deter, for this first trip; because Ruthen was not provided for making explorations by foot on airless planets. As it was, the feat of moving off into space, circling the strange visitor, and safely returning, was sufficient for the first venture.

In addition to the immense crowds on the scene the start of the flight was being witnessed through television service by Martians all over the planet; for truly it was an epochal event. It meant that the time had come when men of Mars were to explore its neighborhood and then the other planets of the solar system. The planet was aflame with the thought of new worlds and it set out to conquer. To Ruthen also the event was most auspicious; for not only did material honors await him upon his return, but what was more, the Princess Argene had pledged her hand to the youthful inventor, and he was to claim her as his bride upon his return.

But alas, Ruthen did not return as scheduled. The time allotted for the flight to Deter, then once around the little body, and return to the starting point, had long passed; the crowd of spectators became excited; all Mars felt the grip of anxiety. Powerful telescopes were brought to bear upon Deter, but they failed to reveal anything, after Ruthen's craft had disappeared behind Deter. He never reappeared! And, as the days passed, the Martians realized that Ruthen was lost. For the first time in many Martian years the scientists of Mars were forced to acknowledge defeat; their science had blundered. Ruthen had undoubtedly plunged onto the body and had been killed.

True, there were details in the construction of the levitator known only to Ruthen, for it was he who discovered the principles which made possible the actual flight into space. These principles he had not divulged to others. Even his friend, Tellur, who had aided him in constructing the levitator, had not been entrusted with all the plans and specifications, for Ruthen had kept the essential principles of levitation a secret. The matter soon became a subject that gave rise to considerable speculation and discussion. All Mars talked about the mystery of their lost hero. Many could not believe that Ruthen had not left complete descriptions of the essential parts of his levitator, and journals of his research work; while others alleged that he had hidden motives for his undue secrecy and failure to return.

Fruitless Efforts

IT was not the way of the men of Mars to accept defeat, or to leave anything undone. So, as it became increasingly evident that Ruthen might not return, an insistent cry was set up that something be done to locate him, to find out whether he were alive, and to bring him back to Mars if possible. Insistent, also, was the demand that a scientific inquiry be made into the mystery surrounding the preparations for the unfortunate flight, and on the heels of this demand came innumerable proposals to rediscover Ruthen's lost secret, and with this to make new attempts at flights into space.

Particularly strong was the theory that Ruthen might have gone to the earth. It was known that he had at many times expressed his keen desire to visit Layd. And Layd was to be the object of a later expeditionary flight, should the flight around Deter proved successful. In view of these considerations, it was felt that perhaps Ruthen, intoxicated by the success of this flight to Deter, had gone directly to the earth and was unable to return. It was this feeling that prompted the intense interest in the records of the earth's radio broadcasts. In fact when it was discovered that the radio was known to the people of the earth, many believed that it was Ruthen who had taught it to them.

In the endeavors to learn the fate of Ruthen, to rediscover his lost secrets, and save him, if possible, none were more enthusiastic than Tellur, Ruthen's friend. Having aided Ruthen in constructing his levitator and sending it on its flight, Tellur felt himself best qualified to take up the work that Ruthen so unfortunately left unfinished. But to do this, he announced, he must first rediscover the principles that Ruthen had kept secret.

Tellur feverishly set himself to this task. All Mars hopefully awaited the outcome; the Princess Argene hardly knew how to express herself towards the brilliant friend of her lover. As time passed, however, and no immediate results were forthcoming, the hope of learning the fate of Ruthen became dimmer and dimmer. That Ruthen was the pos-

sessor of a strange secret of nature, upon which he had bulit his levitator, was now generally acknowledged. Then came the disappointing results of the study of the earth's radio broadcasts, the one world in which the Martians hoped to find Ruthen, and with this last disappointment hope fled altogether.

From enthusiastic encouragement of attempts to fit out another ship to find Ruthen, Martian public opinion now tried to discourage Tellur and the other enthusiasts in their plans to accomplish flights into space. Tellur, at first obdurate in his work, unwillingly consented to forego what now appeared to be a hopeless task. But this was not without its consolation; for his good graces, his friendship for Ruthen, his zeal in scientific research, all won for him the admiration of the Princess Argene. They were now seen much together, and the wiser among the Martians began to predict that Tellur would soon pay his respects to the memory of his lost friend by marrying and making happy the beautiful girl that fate had snatched from Ruthen.

CHAPTER II

Ruthen Comes to Earth

IT was during the year 1931 that a number of savages, living in the heart of the Amazonian forests, were startled to see appear suddenly in the sky what looked to them like some huge and strange bird of prey, making a noise like hundreds of white hunters firing guns in the distance. Soon, the strange object spread out dark gray wings and slowly settled to earth at a distance in the dense part of the forest. The frightened Indians dared not venture too near. It was a matter they felt, in which they must seek the good counsel of their friend, Dr. James, the missionary. Dr. James was found at some distance from where the strange monster was seen to descend; and listening to the natives' story of what had happened, he came to the conclusion that some aviator attempting a long-distance flight had come to grief.

Acting upon this theory, he set out to locate the spot where the airship had fallen, proceeding as fast as the rapid-transit facilities of the forest would permit, and accompanied by a handful of the natives. After searching for some time, one of his guides pointed out a hazy cleared patch in the forest, where the trees evidently had been disturbed. Pressing on in the direction indicated, Dr. James had not gone far when a sharp cry from one of the natives told him that he was close upon the object of his search. There, to his left, was an object not like the airplane he expected to find, but somewhat resembling an ancient Roman trireme. Dr. James stood amazed as he looked upon the strange sight; and his amazement increased when he caught sight of a strange figure gazing intently and critically at him from beside the ship.

After they had studied each other in silence for some time, the missionary observed that the stranger resembled a Hindoo, though not dressed like one. Wondering who he was and what he was doing there, Dr. James addressed him in English; but the stranger remained silent, studying the group before him curiously. Finally, however, he spoke; but the strange sounds meant nothing to Dr. James. The man of mystery, appearing to realize that he was not understood, now began to make gestures, suggesting that he wished something to eat. This Dr. James understood, and bade one of the natives climb a nearby tree and bring down some of the fruit. This done, Dr. James offered it to the stranger, at the same time advancing a few steps, half expecting that the stranger would come forward also.

The stranger, however, disappeared within his ship only for a moment and then reappeared with what looked like a pair of lorgnettes. With this he appeared to scrutinize the fruit that Dr. James held out towards him. Now he moved his hand towards some object at his right, and to the amazement of Dr. James and the terror of the natives with him, a long snakelike object stretched out from the ship towards them, at the end of which was something resembling a human hand, but it was evidently a mechanical contrivance. It moved with this mechanical hand extended, just as a person would hold out his hand when about to receive something. The natives hastily retreated, but Dr. James stood still and held out the fruit, which the mechanical hand took and carried back to the stranger, who now made a sort of gesture of thanks.

Then disappearing again within his ship, he reappeared with a strangely-shaped garland of flowers, which he placed in the mechanical hand, which again moved forward to Dr. James. Taking the beautiful flowers Dr. James, who had always been interested in botany, was surprised that they were wholly different from any that he knew of.

This simple gesture on the stranger's part, however, gave Dr. James confidence in his good will, and at the same time increased his curiosity as to the identity and origin of his visitor. In order to attempt to discover where the aviator had come from, he pointed to the ship, then to the East, the West, the North and the South, and each time he indicated a compass direction he made a sweep of the hand to intimate that the ship came from that direction and dropped where it lay. He then looked at the stranger interrogatively.

Language By Signs

THE stranger soon grasped what Dr. James meant, but instead of acknowledging any of the directions referred to, he shook his head and pointed upwards to the sky. Dr. James, thoroughly mystified at this, wondered whether the stranger could have come from another world. After deliberation, he pointed to the sun, then to an imaginary sun which he pretended to hold in his left hand, and drew a small circle around it with the forefinger of his right hand, after which he held up this finger to indicate the number one. The stranger who appeared very intelligent seemed to grasp that the doctor referred to Mercury, and shook his head. The missionary repeated the performance, this time drawing two imaginary circles to indicate

planetary orbits, then holding up two fingers and pointing to the stranger again to intimate that he was asking whether he came from the planet Venus. Again the stranger nodded in the negative. A third time he repeated the operation, this time drawing three circles, but with a sweep of the arm he indicated that he meant the earth. A fourth time he pointed to the sun, drew four imaginary circles, one outside the other, held up four fingers and pointed his finger towards the stranger.

Again the stranger showed himself quick to grasp what Dr. James wished to find out, and the performance evidently pleased him; he smiled and nodded in the affirmative. Then he in turn quickly pointed to the sun, then drew four circles of increasing diameter, pointed to himself and his ship. Dr. James stood dumbfounded as he began to realize now that it possibly was his unique fortune at this out-of-the-way place to entertain the first visitor from Mars.

He wondered why the stranger did not seek some other and more appropriate part of the world in which to pay his respects, but a little thought made him realize that if this were the first time the world was visited, the Martian must necessarily have chosen his landing place blindly.

By this time Dr. James had so lost his feeling of distrust for the stranger that he was now close to him and his ship, and was beginning to observe the man's evidences of culture, indicating that the Martians possessed a high order of refinement. The Martian in turn continued to study Dr. James and the natives, seemingly trying to understand what sort of world he had blundered into. After a while, the Martian began pointing to different objects, and as it seemed to Dr. James he called out their names and bid Dr. James do likewise. The latter, catching the spirit of the thing, gladly did so, and soon the Martian was his pupil in an elementary language lesson.

This continued for several hours, till a setting sun and the impatience of the natives told Dr. James that it was time to return, and so he took leave of his Martian friend. The stranger bid him come again when, as he indicated, the sun reached a certain point in the heavens.

Dr. James did come the next day and the day after, and soon his trips became regular. He found the Martian a most apt scholar, who with amazing rapidity learned to speak and understand English, and adapt himself to his surroundings. What was more, he proved himself eager for knowledge of every kind, and in turn he taught Dr. James many things new to him. One thing that Dr. James learned was that the Martian's name was Ruthen. They soon became fast friends, and it was not long before the doctor moved his camp close to Ruthen's ship, which happened to be in a very good location. To the natives Ruthen became almost as a god come from the sky—one of those beings that their good friend Dr. James referred to when he told them about the angels.

After several months Ruthen had become so proficient in English that Dr. James could hold extended conversation with him, and now he began to learn something about his strange visitor.

As soon as he was able, Ruthen, who seemed to feel that he owed Dr. James some explanation of his adventure, began to describe his life on Mars, the journey through space, the landing in the Amazonian forests, his concern as to whether he could get anything to eat on the earth, his first feelings of distrust toward Dr. James and his savage friends. He went on to describe how pleased he was to find that Dr. James was friendly, and that he understood astronomy, for it was to him evidence that people on earth had reached a high degree of civilization. Continuing, he told Dr. James that his ship had been damaged when it landed, and he could neither return to Mars, nor fly to other parts of the world, and so he must stay where he was for a while. His purpose in making the flight, he explained, was to make a scientific test of levitation. As Ruthen became more proficient, his story told again and again in its different details, became clearer and clearer to Dr. James, but there was still much that Ruthen did not tell.

With his growing proficiency, Ruthen showed a great interest in terrestrial chemistry and physics, and as Dr. James observed, he seemed determined to solve some problem for himself. But many of his qustions in chemistry and physics were questions that Dr. James could not readily answer, for he was a missionary and not a scientist. Ruthen's inquisitiveness in scientific matters rather puzzled Dr. James, who did not quite grasp whether the Martian's objective was scientific inquiry, or was it just that he needed something to repair his ship. As inquisitive as the Martian was, Dr. James was equally so; he was curious to know what the Martians did, what their world and religion was like, and in fact all about them. To all Dr. James' questions about Mars Ruthen answered willingly, and so Dr. James learned many surprising things, while Ruthen in turn learned much about the world he was stranded in.

One day, as Dr. James reflected to himself that it would not be long before Ruthen would be so proficient that he would need no more lessons in English, he began to wonder what Ruthen's personal intentions really were. He had freely asked hundreds of questions about Mars and its people, but till now, realizing the predicament Ruthen seemed to be in, he had refrained from asking Ruthen about himself. Now, however, Dr. James tactfully asked, "Ruthen, do you ever expect to return to Mars?" To which Ruthen replied sadly, "I am afraid I will be here in this world always."

Dr. James was amazed at this; to think that one so gifted, evidently a person of some consequence in his own world, should be doomed to a strange world, and the Amazonian wilderness at that. As he thought of it, a fear came to him that there might be some reason for his coming to the Amazonian wilderness. Was he a political refugee or had he committed some heinous crime? Dr. James wondered. Again he tactfully asked, "May I ask, will you always stay here in this wilderness?"

"I choose not to stay here," answered Ruthen. "On Mars I would rather be. It is my ship that keeps me here, and unless I can find a certain substance, it will always stay here, for it can no longer move." Now warmed up to the subject, he continued, "As for traveling about this world, I feel that nowhere will I find the substance which I seek, for it is unknown to you, although known to everyone on Mars. Without any hope of finding what I seek, I have no mind to travel, and besides you have been so kind to me that I do not care to leave. I have not told you who I am and the real reason why I came here. Now I will tell you the whole story.

CHAPTER III

Ruthen's Story

"I CAME from the great city of Sudore; it is located where a number of the most important canals of Ferb (what you call Mars) come together, and it is the chief city on Mars, or rather it is what you would call the capital, for there dwells the emperor president of Mars. All Mars, as I have told you, is one nation. I was on Mars a prince of Science, for, as you will understand, those who distinguish themselves in scientific discovery and art are given titles. Being a prince, I was well known to my fellowmen, and having earned my title by my work in Science, I was happy and content, for did not the Princess Argene promise that we were to be married after I had achieved my great ambition. That ambition was to sail a levitating ship from Mars out toward a strange planet near Mars, circle around this body, and then return to Mars. I would have been the first to accomplish the feat, and it was something in my line, for my principal work in science was the study of the phenomena of gravitation. Had I accomplished the feat and returned safely to Mars, it would have marked a great triumph for me in controlling the force of gravitation. I would have been acclaimed, everywhere, honors would have been showered upon me, and the princess would now be mine. But alas it did not turn out so."

Ruthen faltered as he said these last words, and then became silent, his mind seemed to have wandered afar as though he were seeking to recollect something. After a little while, Dr. James asked, gently: "What happened?"

Ruthen, seeming to suddenly realize that he must continue his story, began again. "I do not know. There is on Mars one whom I consider as my friend, one who aided me in all my experiments, who helped me to build the ship you see here. I trusted him fully, yet there is something that is not right. What I mean is that certain essential parts in the controlling mechanism of my ship are worn out. That should not have happened. Was inferior material used through accident or malice? Was it forgetfulness? I cannot say. I would that I were back upon Mars, that I could be sure.

"I will explain further," he continued. "You of this world, as I find from what you have told me, know of the two forces, electricity and magnetism, but there is a third force of which you are unaware. You understand, however, that magnetism and electricity act at right angles to each other, also that magnetism acts best through iron and electricity through copper; the one induces the other when the iron and copper, as fields of their action, are placed at right angles to each other. You know how a current of electricity, moving in one direction in a wire, causes magnetic lines to flow around outside in a field at right angles to the direction of the electric current. Now the third force, the one I have reference to, acts in a field at right angles to both electric current and magnetism. In an electric wire this third force has a direction of action from the centre of the wire straight outward; this is the direction of the electromagnetic wave which you call 'radio.' This radiation is utilized in my levitator to neutralize and overcome the force of gravitation; but the metal necessary for the field coils and plates of the levitator seems to be missing on this planet. For this reason, the people in this world have never discovered the third force acting at right angles to both electric current and magnetism."

"I will show you just what I mean," and with this Ruthen beckoned Dr. James into his ship. They had gone through it together many times before; but this time Ruthen was bent upon showing his friend what looked to him like a huge induction coil, such as he vaguely remembered seeing in London before he took up his missionary work.

"With this," continued Ruthen, "we can, by means of electricity, magnetism and the third force, produce the levitative energy which, acting in opposition to gravitation, raises this ship, keeps it suspended in space, or allows it to fall at any rate you wish; according to how the intensity of the levitative action is regulated and adjusted. This machine you see here is so constructed that the three forces, magnetism, electricity, and the third force, are each equally free to act in its own field, the magnetism through iron, electricity through copper, and the third force through the unknown metal which I am intent upon finding in this world. With that metal I could make the necessary repairs to my ship. But as I have said, I have little hope of finding any of it in this world.

Ruthen's Luck

"WHAT I would like to have you understand is how this ship operates, depending on the adjustments of the levitative force to the gravitational force. This adjusting ought to be done by the mechanism underneath this cover," and as Ruthen said this he proceeded to raise the cover on another piece of mechanism, and brought to light something that reminded Dr. James of a wireless telegraph outfit.

"But," said Ruthen, shaking his head slowly and with an expression of intense sorrow upon his face, "It is part of this mechanism that is worn and must be replaced by the metal which we call xyl. It was all right when I left Mars and it should have lasted forever. But when I left Mars and began to

circle around Deter, something was wrong. I could not adjust the levitating force of the ship to the gravitational force of that body. Were this mechanism intact, I would have been able to so regulate the levitative force to the gravitational forces acting upon the ship, so that it would have sailed right aroun dthe planet and back to Mars.

"It was my friend, Tellur, a friend whom I trusted implicitly, who assembled this part of my ship. Was he careless in his work? It is hard to believe that. Was it malice? Could he, my best friend, be guilty of such a thing? I hate to think it. Whatever it was, I left Mars with a ship of inferior construction and, after passing its moon, imagine my horror to find my ship floating off into space. How it happened I do not know. There must have been a strange set of forces operating that, when I was adrift in space drew me to the earth. Had not the earth been where it was in its orbit, I might have sailed straight into the sun, wholly unable to check my flight. I landed here, forced toward this world by the levitative force and the momentum of the ship. Fortunately in landing part of the mechanism was broken, otherwise my ship might have lifted itself away from the earth to wander into space. In short, I owe my life to the fact that the levitating force of my ship was strong enough to drive me away from Mars and strong enough to resist the earth's pull so that I did not fall to the earth too rapidly. Had my ship's levitative force been greater, I would not have been able to approach this world at all. Had the levitative force failed as I approached this world, I would have crashed into the earth's atmosphere at such a speed that my ship and I would have been consumed as in a fire.

"As I said, however, after I landed, I found that the ship had really fallen to the ground hard enough to damage it. My ship cannot rise again, either to fly to other parts of this world, or to go back to Mars."

As Ruthen finished, he called Dr. James' attention to a mass of broken and disrupted wires, the damage done by the ship's fall. "This," he said, pointing to a square block of glistening metal, "is the material that I am seeking, that I need so much."

Ruthen's Predicament

AFTER some minutes, while Dr. James examined the metallic wires and tried vainly to identify them just as he had tried several times before, Ruthen asked a question which brought up a subject they had discussed once before.

"I am really considering doing what you have said—to take some of these parts somewhere far to the north of here, where I could have them analyzed, and their substance identified. You believe if there is any chance of getting any of this metal, I will get it there?"

"Yes. I really believe it," Dr. James said decisively. And with this, the question of Ruthen making a trip to the world's centers of civilization became an active subject of discussion.

It was a matter that Ruthen had till now hesitated to speak about, because he felt, by reason of Dr. James' unfamiliarity with a metal known to all on Mars, that there could be no such metal in this world, and even if a quantity could be gotten, how was it to be made into the parts needed? For Ruthen doubted whether he could find in the world the mechanical and chemical appliances necessary to carry out the manufacturing operations, and he realized also the difficulty he would have in getting people to believe his story and aiding him to return to Mars. All Ruthen's idea and beliefs in these matters were of course dependent upon Dr. James' knowledge and his opinions of the situation. But the difficulties that Dr. James pictured and the little encouragement the missionary had offered had all plunged the Martian into a characteristic despondency.

Now, however, as they discussed the matter again, it became more and more evident to Ruthen that, unless he intended to remain on earth forever, he must shake himself from the inactivity that had seized him and make the trip to the centers of the world's civilization. But besides the uncertainty of how to find the metal and get the parts made, there were other troublesome details not easy to settle, such as the question of the financial needs. The question most seriously discussed, however, was whether Ruthen should tell the truth about himself to the people he would meet? What would they do and say? Dr. James was of the opinion, and he was certain, that if Ruthen announced his Martian origin and his purpose, no one would believe him; he would be thought crazy and perhaps be put in an asylum, leaving him worse off than ever.

Ruthen was much impressed with the dangers Dr. James outlined, and the conclusion they came to was that Ruthen must travel incognito, secure his ends secretly, reveal the facts about himself only when the time would be ripe, or not at all. This settled, they took up the question of what were to be Ruthen's financial resources while living in the world's centres of civilization. What should he do for a living? It was a knotty question, but it was happily solved in an unexpected way when Dr. James learned that some of the fittings of Ruthen's ship were made of gold, a metal which seems to be more plentiful on Mars than on the earth. So it was finally decided that Ruthen was to take some of this gold with him and use it as necessary.

Finally, after much coaching in the ways of civilized life on earth, the day came when Ruthen was ready to set out for the world centers of civilization. He was given a letter of introduction to Dr. Addis Field, a friend of Dr. James, and secretary of foreign missions of St. Thomas' Church, London, England, which had sent out Dr. James as a missionary. Ruthen planned to pass himself as a Hindoo scholar and traveller. In the interim Dr. James was to take care of Ruthen's ship, awaiting his return, which promised to be in at most three years; Dr. James to consider himself free to dispose of the ship at the end of this time should he not hear from Ruthen. Finally, with all agreements made, plans carefully laid, his mind

stocked with good advice from Dr. James, whose last words of advice were, "You must turn your gold into the world's money, but be careful how you do it," and resolved not to reveal his real identity, Ruthen started out, carrying with him his letter of introduction, his gold, his weapons of defense, besides other necessities. A number of natives accompanied him to the outposts of civilization.

CHAPTER IV

Ruthen Comes to London

IN due course of time Ruthen reached Rio de Janeiro, and for the first time saw for himself something of the world's civilization and was able to compare it with that of Mars. He did not tarry long in Rio, for with a strange language to contend with (he found few who could converse with him in his still uncertain English), his way was difficult.

His stop at Rio ended with his sailing on the first ship to London. Here began more novel experiences for him; the steamship reminded him strangely of his own ship, and he now felt that the world, even if not up to Mars, had nevertheless made considerable progress in civilization. But the thing that impressed Ruthen most was the broad Atlantic, like nothing on oceanless Mars, and he realized now how fortunate he was in not having landed in the ocean. A strange passenger he proved to be: he stood aloof from the other passengers on the ship, often spending his time looking out upon the ocean and thinking of many things—what should he do, what would be the result of his trip, and would he ever see Mars again? One day one of the other passengers facetiously named him Napoleon because of the hours he spent gazing steadily out upon the ocean. But the nickname meant nothing to Ruthen, for he had never heard of Napoleon. However it made him feel somewhat uneasy; he felt that he was conspicuous, but, any way, he would simply conceal his ignorance, go about his business, and keep out of trouble. Gaining confidence in himself, he became more sociable and introduced himself as an Oriental, from some little known part of the East, a man of some means, a scholar who had been travelling in South America.

As such he arrived in London, and we find him next as a visitor to the home of Dr. Addis Field, to whom he presented the letter from Dr. James.

Dr. Addis Field greeted him cordially, pleased to meet someone coming from Dr. James. But while he found Field was very hospitable and genial, Ruthen soon found to his chagrin, that his host was inclined to be somewhat inquisitive, for he lost little time in inquiring of Ruthen as to his nationality, his beliefs, prospects and intentions. Ruthen's uneasiness in the presence of strangers became more and more acute, for he was often at a loss in finding answers to questions put to him. In fact, he found himself in the same predicament that many have placed themselves, being obliged to tell ten lies to save one. Several times he felt that he ought to tell the real truth, but each time he realized that without clear proof no one would believe him, and no one would help him; he would be laughed at and perhaps put into confinement, as Dr. James had warned.

With a nadroitness born of centuries of highly civilized ancestors, Ruthen handled his situation skillfully. Dr. Addis Field never learned just where in the East Ruthen came from, but he was satisfied that his visitor was sincere and well educated; a scholar striving to learn the ways of the Occident, a man of some means, a traveller, and so he gladly helped him to establish himself in London. The first thing Ruthen set about doing was to convert his gold into English pounds, and thus secure for himself ready cash. His story that the gold had been in the possession of his family and was mined in his native land, saved him from detailed interrogation as to where he got it. However, his story attracted the attention of interested persons who wished to know just where in India the gold was found, and they made proposals to form companies with him to prospect for more.

Ruthen encouraged these would-be gold seekers, but in doing this he had his own interests in view. He told them that he could not divulge the source of his gold, not for the present anyway. But he inquired about the metal he needed to complete his ship, hinting that he could do something valuable with it. His idea was that with the metal machined into the needed parts, he might be able to organize an expedition into the Amazon wilderness upon some pretext or other, and on reaching his ship, tell the truth to his gold-seeking friends; and with their aid repair his ship and make his way back to Mars. Then on the next expedition to the earth he would send gold to reward his gold-seeking friends for their trouble.

Ruthen Finds It

RUTHEN'S interest in the mysterious metal he sought for, his haunting of libraries, chemical establishments and machine shops, served to excite interest in his purposes, for being a man who seemed to command a rich source of gold, his mysterious character, his strange knowledge, all marked him as a conspicuous character. Dr. Addis Field thought Ruthen ought to become a missionary. His new found friends, who sought to interest him in gold mining ventures, were keenly interested in him and willing to help him find the strange metal he sought, provided he would show how it would prove remunerative to them. The chemists and mechanics were also persistently inquisitive as to what he wanted the strange metal for, and what was the purpose of the strange pieces of mechanism.

Ruthen was in a quandary; his search for the metal he needed for his ship was ending in disappointment. Despite the most painstaking analyses no chemists seemed able to identify the metal. He was told again and again that it was like nothing ever seen before. He was beginning to feel that although common enough on Mars, it must be really missing on the earth. He had in fact ob-

served that this was almost true of gold which, of no special value on Mars, was sought after madly by earth men.

A day came, however, when to his great surprise a chemist whom he had employed to work on the problem, managed to produce his metal in an allotropic form. Finding now that he could obtain the needed material, and in the necessary condition, he laid his plans. He determined to pretend that this metal, made into the pieces of mechanism he wanted, was to be used in extracting certain rare metals from their ores in South America, and so under cover of his pretended foolishness he would obtain all that he needed to repair his ship. He knew that he would be laughed at for his foolish ideas, and he knew that his gold-seeking friends would desert him in his dream, as they would no doubt call it.

With this ready explanation of his activities, Ruthen did in fact soon convince his greedy friends that he was a dreamer, and thereafter they ceased to take any serious interest in him.

As the news of him spread about, the public began laughing at the expense of the harmless, dreamy Indian scholar, who hoped to extract limitless riches from the jungles. But Ruthen, now working with all his skill as a chemist and inventor, soon had everything he needed—the pieces of mechanism to take the place of the missing parts of the levitation-regulating mechanism of his ship, and the new wires to take the place of those broken by the fall of the ship. All was now ready for shipment to South America; ostensibly to carry out the absurd scheme to extract rare elements, but really to repair and complete Ruthen's levitator. Everything was packed and put aboard ship, with Ruthen sailing as a passenger; and in due time he found himself back in Rio. The equipment being landed, Ruthen, accompanied by Indian guides and beasts of burden, set out on his hazardous journey into the Amazon wilderness to seek both his ship and his friend Dr. James.

After weeks of weary travelling, he reached the tribe where he had left Dr. James and his ship. He noted upon his arrival a spirit of unfriendliness, but upon being recognized, this changed quickly. Upon his inquiries for Dr. James, he learned to his deep regret that his friend was dead, having succumbed to a fever some months before his arrival. To his sorrow there was soon added a feeling of uneasiness. How had his ship fared in the hands of these savages? He indicated his desire to see the ship. The savages willingly accompanied him to where it was located.

As he approached he realized that his fears were well grounded. To his horror he found that the ship was an almost complete wreck, dismantled and destroyed by the savages. He looked on in anguish. Now that he had all the material needed to make all repairs and adjustments, and be on his way back to Mars, he was helpless, a prisoner lost in a strange world. His one real friend was dead, his work of months useless, all his hopes completely shattered. He realized sadly that it would be years before his ship could be rebuilt. Worst of all, he was among savages. What was he to do? He realized that he must think quickly. He determined to play missionary and intimated to the savages that he was a successor to Dr. James. As such he found himself very acceptable to the savages and soon they were fast friends.

After a few weeks spent as a self-appointed missionary, he found time to study the situation thoroughly to decide finally if he might reassemble the wreckage of his ship. But he found the task an impossibility. Knowing the value of the gold used in constructing his ship, he salvaged what he could of it, determined, since he was fated to remain on earth, to provide a sustenance for his life in this world. With the aid of several of the natives, he reduced this gold to a condition in which it appeared as if it had been recently mined. This done, he, one day, upon the pretext of paying a visit to a neighboring tribe, departed for the coast, taking with him his gold, but leaving behind the remains of his ship and all the new and repair parts made of the metal he had worked so hard to obtain.

CHAPTER V

The Message

BACK to Rio de Janeiro he went, filled with despair, his heart broken, his thoughts turned again and again to the certainty of Tellur's treachery. He now for the first time began to seriously think about whether he could in some way communicate with Mars. His thoughts turned to the radio, but he had little hope of any results here. As it was Ruthen, being too busy with his work on levitation while still on Mars, had not informed himself about the discussion which arose when the world's dot and dash radio messages were first detected by the Martians.

Now, as he turned the thought over in his mind, Ruthen did not believe that it was possible to radio to Mars, for so far as he knew, the Martians had never heard anything from the earth. And further Ruthen feared what people would do if he attempted to use a radio broadcast station to try to reach Mars. The more he pondered the matter the less promising did the radio appear as a means of communicating with his fellow Ferbians.

As before, Ruthen tarried in Rio only long enough to get the next ship for England and in course of time he was back again upon English soil. Finding Dr. Addis Field, he told him of Dr. James' demise, and when asked about his success in his late venture, he acknowledged it a failure, but he offered no account of his experiences. Established again in London, he converted his gold into cash, and soon found himself comfortably placed, though he was not what would be described as wealthy. It was not long before his gold-seeking friends again sought him out and renewed their propositions to prospect for gold in India, or South America as they now suspected the source to be. But Ruthen was finished not only with the metal he sought for, but with every other chemical and mineralogical

venture. Feeling, however, that he might always be bound to the earth, he determined to travel and learn as much about it as possible. Accordingly, as a start he set out for Paris, of which he had read and heard so much.

At the railroad depot, while waiting for his train, a strange thing happened. As he was pacing up and down aimlessly, thinking of what remote possibility there was of ever building a levitator on the earth, with which to get back to Mars, or of radioing to Mars, he happened to pick up from a bench a magazine. Something attracted his attention, another look and he stood still, amazed at what he saw. Hardly believing his eyes, he perused the article excitedly. It was unmistakably a message in the Martian language, a personal message meant for him or anyone who understood Martian.

It read, "We Martians can receive the earth's radio programs, as well as perceive your world through the mind of the person who writes this. If you, Ruthen, are on the earth, we on Mars will await your message, either by the radio or spoken to the writer of these lines. If anyone can read this and knows of a ship that left Mars and did not return, let him say what is known."

First taking a hurried glance at his watch as a precaution against missing his train, Ruthen started to read the article in which the Martian messages figured in the text as an illustration. The first few lines told him that the article was an account of how a woman, placed in a hypnotic state by Byran, the great medico-psychologist, had revealed that messages which purported to come from Mars, had impressed themselves on her consciousness. Not only did she transcribe a message in Martian, but she also drew figures of plants, animals and other things on Mars, all of which were to Ruthen remarkably correct.

The public scoffed at the whole thing, and would have laughed it to contempt had not the name of the great Byran with his amazing discoveries into curing by radio-hypnosis been associated with it.

All the way to Dover Ruthen pondered over his strange find, so unexpected, so inexplicable, because he could hardly understand how his friends on Mars could have found means of communicating with a person on earth, to be received accidentally, as the article indicated. How could they be so seemingly confident that he was on the earth? He now realized that it was possible for Mars to communicate with the earth by radio. He, like many other Martians, had never believed previously that it was possible to send radio messages from one planet to another. This belief, which he had maintained until the present, together with the attention he might attract were he to try to use the radio to broadcast to Mars, had deterred him from even trying that means. But what puzzled Ruthen most was, what had the Martians to do with hypnosis and what had hypnosis to do with the radio?

Ruthen, however, had little difficulty now in making up his mind. He would go first in Paris to seek the woman, for it was in Paris that the woman who received the message had been treated by the famous Byran.

How it happened that a message from Mars came to be received by radio-telepathy on earth, and be used to illustrate an article in a magazine, must now be told.

The "Gilyd"

AT the time that Ruthen was working on his ship preparing for his flight, Auret, a fellow scientist living at a distant point on Mars, was engaged in experimental work with what might be described as nerve rays. Little did Ruthen dream that some day Auret and his experimental work would play an important part in his own affairs.

Auret's attention, for many years, had been directed to the phenomena of nerve impulses. It was well known that the action of a nerve impulse in doing its work, and which we define as a reversible progressive chemical reaction, is really related to the phenomena of certain rays of the ether spectrum of wave length near the ultra violet. It had been known to the Martians that these ether waves and the impulses that travel over the nerves are related in the manner that radiant heat is to physical heat, chemical rays to chemical action, and light rays to luminescence. It had long been known that a nerve impulse sent out from the brain could, under certain undetermined conditions, continue out into space from the end organs of sense, or even directly from the brain itself. These nerve impulses, moving free of the nerves, and as wave impulses in the ether, are what the Martians called "Gilyd," or we would call nerve rays. Similar rays in turn impinging upon a nerve organ, or even the brain itself, become mental impressions which are carried to the seat of perception, making the mind conscious of the sensations transmitted. These nerve rays are then to the brain and nervous system what wireless telegraphy is to wired telegraphy; here the ether acts as the medium transmitting the impulse. It was found by the Martians that these "Gilyd" were most uncertain in their phenomena; their laws were not understood, but when conditions were right, they showed themselves in mental telepathy.

What Auret sought to do in his research work was, by means of a certain contrivance which he invented, to concentrate and direct the "Gilyd" to just where he wished, and thus discover the laws underlying the phenomena observed. What Auret succeeded in doing was to construct a mechanism which sent out a stream of "Gilyd" which picked up the mental impressions from the brain of any "Cordet" who happened to be put under their influence. A "Cordet" was a person whose nervous system possessed a high electrical potential and could throw off impressions to one of a lower potential. He found that by means of his mechanism he could concentrate and amplify the power of his "Cordet" so that he would become a powerful source of mental impression. In his experiments he succeeded by means of a "Cordet" in sending a message to a fellow scientist in a nearby town, whose

brain or nervous systems happened to be sensitive to the rays and in their path at the time. After this success, Auret found a way of directing the rays so that after they had gone a certain distance, or else impinged upon the nervous system of some living being they would return to their source, and coming back, bring impressions to the mind which directed them. In this way, Auret, with his machine generating the rays, with his selected "Cordet" and a person whose mind was sensitive to the rays achieved practical telepathy. By Auret's discoveries the mind was given a means of sensing things at a distance, or rather of seeing, hearing and acting upon the minds of persons at a distance.

An Amazing Discovery

IT was not until sometime after Ruthen and his levitator were lost, and also after the discovery that there was radio broadcasts being received from the earth, that Auret developed his apparatus to such an extent that he could direct the rays as far as the surface of the earth, across millions of miles of space. But when he succeeded in doing this, the Martians were startled by the results. Now for the first time the Martians were beginning to really learn something about the earth, its world of life, its languages, customs, features and the like, all through impressions received by "Cordets." The results, though somewhat indefinite, showed however an agreement in results which proved that the experiments were reliable.

One of the things that could be done by means of the nerve ray was the production of impressions at will upon the mind of a person at a distance, it being necessary however that this person happen to be either hypnotized, or else in a super-sensitive state, the same conditions being necessary also to read the mind. So when Auret succeeded in bringing the earth within range of the rays, one of the things he did, besides studying impressions received from the earth, was to try to impress a message upon some person's mind on the earth. Auret had the remote hope still held possible by a few people on Mars that Ruthen might still be alive and on the earth. It was a long and tedious searching and hard work to direct the nerve ray till it rested upon a worldly mind so conditioned as to be sensitive to it and receive the message. And so it happened that Auret did finally happen to direct the rays upon and reach the mind of a woman that the great Byran was treating with radio-hypnotic healing 40,000,000 miles away. And the master mind of the Martian sensed the fact that here was the best opportunity in all time to impress a message upon the mind of a person on earth, for the woman's mind, so to speak, was open to all cosmic impressions. Auret grasped the opportunity, and thinking of nothing more appropriate, took the chance of sending a message in Martian for Ruthen to read or hear of.

Even the great Byran himself shook his head dubiously when the woman in the hypnotic state began to mark on the pad in front of her the symbols of the Martian language that Auret was frantically transmitting. Byran was inclined to disbelieve the results of his own operation when his patient indicated in her trance that she had been on Mars. Byran made no mention of what had happened until a month later when he spoke of it to a friend, a professor of psychology. The latter, struck by the novel character of the communications received, wrote an article upon the subject and illustrated it with the message the woman had written while in her trance, and the pictures she drew of Martian scenes and objects. Thus by the merest chance, Ruthen did happen, as he glanced at a copy of the magazine in which the article was printed, to see a message in Martian, which he alone could read. It was a message that meant to him that he had not been forgotten, that hope for him had not been given up. And so it was that as we left him he was hurrying on his way to reach Paris, in the hope that by an interview with the famous Byran he might somehow be placed in communication with Mars.

But really Mars had given up all hope of ever hearing from Ruthen, for as months passed and nothing was heard from him, the Martians considered his fate a mystery that might never be solved. Even Auret was not surprised by the negative results following his experiments with the new ray. The successful planting of a message in Martian upon the mind of a person on earth had, as the Martians realized no effect upon terrestrials than to excite curiosity, but no understanding. It was no more than what Auret and the Martians really expected to find; the people on earth had in no way ever been influenced by a Martian landing among them.

Ruthen's unknown fate did not at first discourage others from projecting attempts to make flights into space, to circle around the strange planet, but as none of these adventurers possessed the essential secret which Ruthen had discovered, which made it possible to levitate as far as one wished from the gravitative influence of Mars, their interest waned. The only one who persisted was Tellur, who aided Ruthen in making his flight and possessed his plans. He had now for some time worked on a new ship with which he planned to make the flight around Deter, just as Ruthen had planned, but things were happening which made the flight a thing that Tellur must abandon.

First there was the pleading of the Princess Argene, who had now learned to love Tellur and did not wish him to risk his life on so uncertain a venture. Then came the command of her father, Platon, the emperor president of Mars, voicing public opinion against foolhardy attempts at levitation into space, forbidding him or any other Martian to risk his life in any levitator whose construction and mechanism was not fully known to and approved by the Blendo, the great Martian scientific society.

It was the pleading of the Princess Argene that meant most to him, for ever since the loss of Ruthen he sought to comfort her with little attentions. As time passed he began to breathe his love for her and told her that the best way he could honor

his lost friend was by making happy the girl he left behind. While the Princess now loved Tellur and expected to make him happy by becoming his bride, still she could not forget Ruthen, and in honor to his memory she forbade and haste in contracting marriage with her second love.

Tellur did not quite approve of this delay but his pleadings and little arguments failed to move her. In fact it was not till about the time when Ruthen was on his way back to Europe, following his bitter experience in the Amazon forests, that she set the time for the wedding, and for one-third of a Martian year in the future.

The Princess did not know of Auret's attempts to sending messages to the earth to Ruthen, though she did hear of his wonderful and successful experiments with the nerve ray. It would have made but little difference had she known, for the Princess had but the barest hope that Ruthen could be living on the earth. The simple fact that nothing in all the world's radio broadcasting, which Cobal had listened to and recorded, showed any Martian influence, was sufficient proof; for it had been felt that had Ruthen landed on the earth, he would not only have become an object of public attention but would have taught the people something about Mars, the language and music, for Ruthen was a gifted musician. These influences the Martians should certainly have found evidence of in the earth's radio. The Martians of course did not know the real circumstances of things, and how it happened that Ruthen really found himself obliged to live incognito, instead of becoming a leader among earth men, as the Martians thought he would be. So it happened that when Ruthen was on his way to Paris, the Princess had already given her hand to Tellur, and their marriage was being looked forward to as one of the leading social events on Mars.

Could Ruthen have known of all this he would have felt his haste to reach Paris fully justified. But his haste was in vain for his mission was to meet with disappointment. Upon reaching Paris, he spent several days in making inquiries, only to find that the woman sought had left Paris for her home, a hamlet located in Provence, while the illustrious Byran was traveling abroad.

Somewhat disappointed, but not discouraged, Ruthen set out for the hamlet to find the woman who gave the world the Martian message. Arriving at the little town, he soon located her. She greeted him cordially but refused to allow the treatment on her without Byran's consent. Ruthen was somewhat irritated and perplexed at this, yet was unwilling to desist in his endeavors. By way of impressing upon her his sincerity, he inquired particularly about the Martian message. The woman, proud of a possible rise to fame, welcomed his interest and gladly discussed the subject, but still refused to try to receive a new message. Finally however, her curiosity aroused, she asked the reason for his particular interest in the Martian message. Ruthen, still bent upon inducing her to try to communicate with Mars, averred that he believed the messages contained some information invaluable to the people of the earth. That a great disaster threatened us which might be avoided.

Ruthen's sincerity and persistency gained his point. An assistant of Byran was called from Paris with his equipment, but nothing came of it; no messages were received from Mars. It really could not have been otherwise, for Auret was not at that time directing his nerve ray out into space. He, in fact, had not done so for some time, for hope in the aviator's existence had almost died on Mars.

One failure did not deter Ruthen; he arranged for a later effort, but still no results. Although his hopes began to dwindle he still persisted, because, as he reasoned, the time might be inappropriate. That something like this was the case became more evident, when upon inquiry, Ruthen found that it was some six months since the woman had received the Martian messages.

Ruthen Ponders

RUTHEN took the next train back to Paris. Here he stayed for a few days and then returned to London, his mind set upon solving the riddle and planning some course of action. As the message read, Ruthen could also use the radio to broadcast his answer to Mars. But there were great difficulties to this. Were he to apply to a broadcasting station for permission to transmit a message to Mars, he would simply be refused and laughed at. Were he to try to set up a broadcasting station himself, he would be detected for such a station would have to be a very powerful one, and would be very conspicuous. Besides where would he get the money needed to set up such a station; and how would he know if his people on Mars were receiving his messages?

Ruthen realized several things. First, there were on earth neither aerials, nor receiving sets in existence that were capable of tuning in Mars. Furthermore to set up such aerials and construct a receiving set would be also very costly, would make him a conspicuous figure. A station capable of tuning in Mars would require two immense upright aerials, each about 2,000 feet high, separated by several miles, and with special apparatus to detect the waves. Ruthen felt certain, now, that Mars could not possibly know just what the conditions were on earth, when they simply asked him to broadcast a message by some radio station. They certainly did not realize the difficulties in broadcasting, nor did they realize that he could not set up a receiving station to listen in on Mars in return, without exposing his secret.

Ruthen puzzled over these things till finally a thought came to him like a flash. On Mars the various scientific observatories had for years been keeping records of cosmic rays coming from every direction in the universe. These extremely short wave radiations were found valuable, for they gave indications of certain changes of conditions in the stellar universe. Suppose, thought Ruthen, I were to create these short waves artificially, and direct them toward Mars in the form of a code signal. It

was something that Ruthen quickly knew he could easily do, for all scientifically trained Martians know how to produce these cosmic rays. This knowledge is one of the fruits of long centuries of study in the properties of electricity of extraordinarily high amperage, a subject that the earth neglects, being interested only in high voltage. It was possible, with radio parts, that Ruthen could buy, and others that he could easily make, to build an extremely short or cosmic ray set, that could direct a veritable stream of cosmic rays an incredible distance, even to Mars, with good chance of striking the sensitive receivers of some cosmic ray recording set. Having satisfied himself that he could buy and build all that he needed for a cosmic ray broadcasting set, Ruthen chided himself for not having thought of it before.

Now another thought came to him. How was he to know when his message was being received? This caused him to do some more thinking. In some way, as he realized it, the answer could come by radio-hypnosis. But when and how? What seemed to be the best thing to do was to indicate a definite time when the earth could be most easily reached. This he believed would be at the earth's inferior conjunction when the earth would be between Mars and the sun. At that time he would have a number of persons in various parts of the earth under the influence of radio-hypnosis so that if a message were sent one should receive it.

His plan of action complete, Ruthen lost no time in constructing his cosmic ray set. At the same time he became, as he seemed to be, an ardent convert to radio-hypnotic healing. His charm and personality, his foreign demeanor and his supposed origin in the mysterious East, together with his earnest quest for instruction from the great Byran, all made him welcome to the eminent man, and so he attended lecture after lecture at the Sorbonne in Paris and cultivated the friendship of several of Byran's assistants and proteges who might help him to operate the various equipments. Thus he felt prepared for the day when he would send his messages to Mars.

With everything all set and ready, Ruthen awaited the propitious time, some ten days before the earth's inferior conjunction, and then one night he sent out his message telling of his arrival on earth, his predicament, his receipt of the message, his inability to use the world's radio and the preparations to receive further communications at the earth's inferior conjunction. Night after night he sent out his messages, and until ten days had passed. Then from the tenth day his "stations" all over the world were tuned in through his radio-hypnotic subjects to receive the message.

During this time that Ruthen was communicating with Mars, preparations were being made for the wedding of Tellur and the Princess Argene. All Mars looked on with intense interest. The city of Sudore, ever athrob with excitement, was somewhat livelier than usual, visitors were pouring in to attend the preliminary festivals to the ceremony, the city was being decorated and even now was gay with color, the great temple being the chief scene of great activity, as details for the ceremony were being arranged. For six Martian days the city of Sudore had reacted from its grief over Ruthen to revel in forgetfulness in the approaching wedding. Tellur was expected to arrive in his palatial aero car accompanied by many of his friends.

With Sudore at the height of its preparations for the wedding, now only a day away, Alum, the director of the astronomical observatory near Sudore, was hurriedly approached by several of his assistants in a great state of excitement. They held in their hands a number of the recording strips taken from the machine which mechanically recorded the variations in the cosmic rays coming from various points of the universe. They laid the strips before the eyes of the startled director, who wondered what amazing cosmic tragedy or upheaval his assistants had detected that caused the excitement. "Look!" they said, and when Alum did his amazement knew no bounds. For there in the almost monotonous record of nature's cosmic rays was Ruthen's message, running through the record, and repeated again and again on different strips. As was the custom these strips were not examined and studied except at certain times. So Ruthen's message had not been observed immediately.

The Voice from Outside

THE startling news was not long in being broadcasted by radio, and the strips, with Ruthen's message in the Martian signal code running through the record showed by television all over the planet. Soon all Mars knew about it. Alum lost no time in communicating with Auret, who had carried out the nerve ray experiments. Not for many centuries had there been such intense excitement on Mars. The laboratory where the nerve ray experiments were carried out, soon became a scene of feverish activity, as Auret's assistants prepared the apparatus for further use. Auret cancelled his present engagements to return to the laboratory. The Martian public, which until now had taken only an academic interest in the nerve ray experiments, now betrayed an anxiety such as it shows rarely.

To the Princess the news came like a voice from the dead. She was in the palace garden at the time, surrounded by her intimate friends, directing the decoration for the garden fête to be held after the wedding. She sat down when she received the news, simply stunned. Her friends surrounded her, sympathetic but helpless, her feelings now a confusion of joy and incomprehensible sorrow. Soon her father, Platon, the emperor president, appeared upon the scene; he tried to quiet the now almost hysterical girl and assured her that she should have her will, to either marry Tellur or postpone the wedding to await the possibility of Ruthen's return. But the Princess felt that she could not decide. Just then Cromin, the high science-priest, came in, also attracted by the startling news. Asked what he

would counsel, he replied that all efforts must be made to rescue Ruthen. He was seeing to them. The popular mind then was excited with two eventualities: would Ruthen be rescued and would Tellur claim his bride, or would he honor his best friend by returning to him the love which rightly belonged to him?

The latter part of the question Tellur was never to answer. When he received the news that Ruthen had been heard from, he was at the great hotel in the city of Arsel, where he was stopping, on the way to Sudore. His friends and many patrons who surrounded him, expressed embarrassed surprise at the turn of affairs. Tellur, although he assured them he was not dismayed by the turn of events, bore a worried look. He gazed intently at the televisor, which just then began showing the momentous cosmic ray record strips; and he seemed visibly nervous as he examined it closely. Someone told him just then that Auret was about to communicate with Ruthen by way of the nerve ray. Anxiety and fear then showed plainly on Tellur's expression, and his friends soon noticed it with great surprise. Hurriedly leaving the hall without a word to his friends, he hastened to the roof, called for his aero, jumped into it and was off to his own home. There he sought what seclusion he could, ignoring all inquiries but intently interested in all that the radio and television stations were announcing in connection with the Ruthen case.

Tellur's hurried flight and seeking of seclusion could not fail being noticed and excite comment. Even the Princess was ignored, for when she heard that Tellur had fled, she visa-phoned him asking why, but he would not answer. This slight to the Princess soon became known and served to arouse suspicion. People remembered that he was Ruthen's friend, he had helped Ruthen make his flight; there was no reason why it should not have been a success. Ruthen had not as yet told in his messages why he failed to return. Now the Martians began to wonder and inquire. What was Ruthen's story of his flight?

For the answer all looked to Auret, who was now at the laboratory and had the nerve ray apparatus all ready for the time Ruthen had planned to have his "stations" operating. The first message sent out by Auret was: "Is Ruthen there? What happened to your levitator?"

For many Martian days Auret broadcast his message and although the cosmic ray records were inspected continuously no answer came. Undaunted, he tried again and again, amplifying his power to the highest degree, a thing destructive to the nervous systems of his "Cordets" or agents. Finally his efforts were crowned with success, for the cosmic ray records showed the sentence repeated over and over: "Am alive on earth. Message will follow."

Ruthen, on earth, on receiving a message from one of his stations that something had been received, was overjoyed. From Paris he directed the communication. A few persons who had come to the "seance" saw nothing but a Hindoo, as they thought Ruthen to be, trying some mad scheme, perhaps, speaking to the shade of someone dear to him. They were much impressed by this triumph of "spiritualism." Communication with Mars being at last fully established, Ruthen told by cosmic ray the whole story of his flight, how he left Mars, the accident in space, and how his levitator drifted to the earth; how he found essential parts of his ship missing. He asked that Tellur be questioned about his absence.

Auret in return told Ruthen of the wedding so unceremoniously interrupted. Then getting into communication with the Princess, he told her of his success in finding Ruthen, and allowed her to send a message.

The joy of the lovers when they found themselves in communication with each other, even so indirectly knew no bounds. What their first greetings to each other were we need not say, but soon the lovers turned their attention to more serious matters, when the Princess asked Ruthen about what plans could be made to rescue him and what sort of people he was among.

The Martians Debate

RUTHEN then briefly described the world and its people, the circumstances he found himself in, and then getting down to the most important point, the question of how to get him back to Mars. He told the Princess that Tellur possessed complete plans for his ship, and that there were also duplicate plans, which he placed in the archives of the library he left at his home on Mars. He assured the Princess that he held no secrets from Tellur, and that the trip to the earth could be made easily and safely. Ruthen was much disturbed when told that Tellur had built a ship with which he intended to make a flight around the strange planet, and was only discouraged from doing so by the Princess. Thus the newly established communication continued for some time.

Ruthen's account of his flight, the reason for his failure to return to Mars, and his landing on the earth, his account of the people he found there, and the fact that communication with the earth was possible, were soon upon every Martian tongue. The emperor president Platon, upon hearing the details, sent an imperial command to Tellur, ordering him to appear before him to answer certain questions. Tellur saw the messengers coming, and realized that it boded him no good. Fearing that they came to arrest him, and not just to escort him as a free citizen being accorded the honor of an interview with the chief executive of the planet Mars, he hastened towards the hangar in which he kept the levitator. This was the ship which he had built and in which as he claimed he was going to make an attempt to fly around the strange body.

Getting into the ship he was soon out of the hangar and soaring through the sky. The messengers, seeing this, gave the alarm. The fleet of aero-cars come to arrest Tellur was equal to the occasion. Before Tellur and his levitator got out of sight,

the crew of the armed aero had the disintegrating ray gun trained upon the fleeing Tellur, and soon the rays pierced his ship. However, owing to the distance Tellur had gained, the rays did not strike a vital spot and stop the ship's flight, and before another blow could be struck, Tellur was far out into space, headed no one knew where. Out and out he went, but the rays had been seen to strike and they did destroy something, for through the powerful telescopes that were now trained upon Tellur and his ship, it was seen that his course away from Mars was not in a straight line as it should be if he had had full control over his ship. Instead it was moving in a circular course, as a closed orbit around Mars. For many months his plane was seen as a tiny speck rushing about the planet. But then one day it had disappeared into eternal space.

The flight of Tellur and his untimely end stamped him a self-confessed criminal, and with this it was seen that Ruthen's flight would, but for Tellur's treachery, have been certainly a brilliant triumph. With a renewed faith in their scientific knowledge, the Martians now turned with a new zeal to conquer space, not alone to fly out to and around one of their little moons, but to visit the other planets of the solar system, now so patently possible.

Ruthen sitting in his London home where he had transferred his equipment and set up his radio-hypnosis station was now in regular communication with Mars. He followed the progress of his friends on Mars in building a levitator far larger and better than the one he set out in, and manned not by one, but by a large crew. He gave much valuable information, calculated to make the new ship and its coming journey a success. With so much to communicate, Ruthen realized that he must work quickly, as the planets were swinging further and further apart and the time would come when the earth and Mars would be far apart and with the sun between them, then no communication would be possible by either cosmic ray or nerve ray.

As the new ship was being built, and as Ruthen, after attending to the important details of the new ship's progress, described the earth and its people, a question came up among the people on Mars and another in the mind of Ruthen. With the Martians it was a question of whether the levitator should boldly land on the earth, and announce itself to the people of the earth. Should they open communication with the world, carry on commerce, begin diplomatic relations, or should a secret landing be made to pick up Ruthen, leaving the earth and its people alone? To Ruthen the matter became a question of whether he was to boldly tell the terrestrials who he was and announce the coming of a ship from Mars, or continue to hide his identity. He realized again that he would be laughed at if he announced anything, so he concluded that when the ship came would be time enough to speak, if the Martians so determined. As it was, there arose widespread opposition against opening of intercourse with the earth. The matter soon became and still is a political and social issue, fiercely debated. The conservatives contend that Mars should continue to remain isolated from all other worlds in space, while the radicals claim that this isolation must end.

The leader of the conservatives is Cromin, the highest science priest of Mars, while the leader of the radicals is Auret, who, in developing the nerve ray, did so much to bring about the issue. The subject has now become the great topic of discussion, and it is an issue soon to be settled at the polls, that being the way the Martians settle all questions, the verdict being announced by proclamation by the emperor president Platon.

Cromin spoke on the subject at the great temple in Sudore before a vast congregation numbering thousands, and his voice and the scene were heard and seen all over Mars by untold millions of deeply interested listeners. Cromin was a man of authority on the theory of cosmogony that Martians accepted, a science that has been their heritage from prehistoric times. What he said was this:

"Fellowmen, it is our belief, handed down by untold generations, that our world is in truth a stage, our lives the playing of little parts, each of us a minor player. It is the teaching of our history that this world and life were created to serve the purpose of a higher world.

"We know and believe that Nature created each stellar body to be a separate theatre of action, to fulfill its cosmic purpose.

"Now, I say to you, my fellowmen, shall we break down this isolation which Nature has given us, by entering unbidden into the worlds of other peoples, and inviting these people with their different ways, beliefs, civilizations, and all their peculiarities which Ruthen has so vividly described to us, to come to our world? So I say to you again, Nature created our worlds as separate, and so must they remain."

But the progressives had their argument, which was simply that not each world or planet, but each solar system, and perhaps the whole universe, is meant to be finally one world, or one stage, with all life one gigantic game. They pointed out that in the ancient history of Mars, there was a time when Mars was divided into separate isolated nations, each with different ways, beliefs and histories, with no radio, television or any other form of communication between them. And yet today all Mars is one nation, one people. So they argued if Nature so created Mars in the beginning, then those conditions should have continued, if Nature worked for continual isolation. But as Mars became all one people to its greater happiness, then certainly Destiny wills it that all the worlds or planets become one world, one stage of action, one great game.

And so the discussion continues. What the outcome will be, whether Ruthen will be taken from the earth secretly from the same Amazonian forest in which he first landed, or whether the Martians will boldly venture upon the earth and announce themselves, no one yet knows.

THE END

(*Continued from page 599*)

had come in answer to a certain advertisement; they were told that they would be interviewed at once. In a few minutes they were taken into a private office.

"One at a time, gentlemen," said a middle-aged man, sitting at a desk.

"But we are both applying for the same position, sir," said Wright.

"But I only want one man."

"We know that; but together we have the necessary qualifications, and separately we won't do at all. So, it's both of us or none."

"That's odd. Was there anyone else out there, wanting the position?"

"There did not seem to be."

"Perhaps you will do. Which of you knows the Reelfoot Lake region?"

"I do," said Ormond: "I was raised on the west shore of the lake. I have hunted and fished a lot over it and I can shoot. There is nothing I'd like to do more than shoot. I would rather shoot than eat, and I like to eat."

"Can you do big game?"

"Never have, but I have an elephant gun, and I've read a lot about it."

"My word! What is the idea of an elephant gun if you never use it?"

"Just an idea. Never can tell when it will come in handy."

"A very good idea. I presume that you are not a scientist?"

"Not at all. But my friend is; he knows a little about everything when it comes to that sort of thing. Our idea was to take the position on one salary."

The Englishman lit a cigarette and looked vacantly into space. At last he gave his decision.

"I believe that you will do. At least it will be worth the trial. Suppose you come around to my hotel tonight and I will tell you just what I have in mind. How about salary?"

"Is it a position or a job?" asked Ormond.

"How odd! What is the difference?"

"A position pays about a hundred a month; while a good job is worth at least fifty or sixty a week."

"If that is the case, we had better call it a job, and put the wages at one hundred a week for the two of you with all expenses."

(*To be continued*)

The Greatest Interplanetarian Story of all Time

is to our minds

"The Shot Into Infinity"

By Otto Willi Gail

During the past few years, the Germans have progressed rapidly in serious attempts to solve interplanetarian travel. In the present story by one of the greatest German science fiction authors, Mr. Otto Willi Gail has given the world a real story on interplanetarian travel, not based upon the usual fiction, but upon real science.

In writing the story he has had the collaboration of the most famous German scientists—experts on the subject. A most marvelous story, which will be a classic for all times, is the result. At least 60 to 70 per cent of the material contained in this story has never appeared in print before in any other science fiction interplanetarian story.

This story along with many other superb ones appears in the new SCIENCE WONDER QUARTERLY.

Watch the Newsstands for the Gold Cover

Science News of the Month

ASTRONOMY—METEOROLOGY

200-INCH TELESCOPE TO ADD TO KNOWLEDGE OF THE UNIVERSE

The building of a 200-inch telescope for the Mount Wilson Observatory is not simply to obtain greater size, as such, says Professor H. H. Sheldon in the *New York Herald-Tribune*, it is a real attempt to push back, further and further, the frontier of the unknown universe about us.

Although six thousand stars can be seen without a telescope, a good telescope increases this number a million times; and with our best telescopes this ratio can be raised ten fold. Not only are more stars seen, but those which are seen are magnified sufficiently to enable us to gain valuable data as to their construction and the changes in their states of existence.

The telescope is being made possible by the development of fused quartz by Edward R. Berry of the General Electric Company. In the words of Dr. Walter S. Adams of the Mount Wilson Observatory, "the design of this huge instrument is being studied from a view to providing the greatest possible light-gathering power and efficiency; to aid in the discovery and investigation of faint stars and nebulae; the analysis of their light by the spectroscope and the extension of the limits of space beyond those which can be obtained by existing tele-[illegible]."

THREE METHODS OF STAR MEASUREMENTS POSSIBLE

There are three methods of measuring the distance from us, and the size, of a star, says Professor Walter S. Adams of the Mount Wilson Observatory. There are the direct method of triangulation; the observation of a star's apparent brightness and the observation of intrinsic brightness. The first method of measuring the star's distance is used only when the star is close enough to keep the errors in this method within limit. From the knowledge of a star's distance from us and its "apparent" brightness (its observed brightness) the "intrinsic" or actual brightness of the star, and therefore its size, may be calculated. The latter two methods are operated by the photometer and the spectroscope.

In order to give an idea of the size of the universe, Professor Adams pictures the path of a ray of light travelling through it at 186,000 miles a second. Starting from the sun it would reach the earth in eight minutes and pass Neptune, the outpost of our solar system, in four hours. The light emitted from the sun at any one moment would meet no bodies beyond Neptune until, at the end of four years, it would reach Alpha Centauri; and from then on, would continue to pass a great number of similar stars, all of about the same intrinsic brightness as our sun. Nine years away from the earth, the light wave would meet the first giant star, Sirius; and sixteen years later it would reach Vega. Then it would pass Arcturus, and the cluster of the Hyades; the latter after 130 years. From then on it would pass through great star clusters and after leaving our Galaxy, in 100,000 years or so, it would travel for thousands of years without encountering a star. "Messier 31," a separate galaxy, would be reached after 840,000 years and the Great Nebula in Andromeda after 900,000 years. And if it did not weary of the journey, after 50,000,000 years' travel away from the sun, a ray of its light would reach a group of nebulae which appear in the constellation of Coma Berenices.

MOON TO PERISH AFTER 40,000 MILLION YEARS

The moon which was once very close to the earth, after having been torn away from the earth, has been gradually drawing farther away, says Albert Parsons Sachs, in the *New York World*, but it will reach a maximum distance and gradually come closer again. For 4,000 million years the moon has been drawing away from the earth; but at the end of 40,000 million more years, this movement will cease and the return of the moon toward the earth will start. When the moon is only 3,600 or 4,000 miles away it will break into a great number of pieces which will form around the earth a ring comparable to Saturn's. The explanation of all this is based on tidal action. The earth was created by the tidal pull of another star on the gaseous sun. The moon was torn away from a part of the earth by the tidal pull of the sun on the liquid earth. Tidal friction between the earth and its moon caused both to slow up, and recede. Then, when the moon gets far enough away from the earth, the tidal action of the sun will again be more important than that of the moon and the earth will slow down. Then the moon will begin to draw closer again. But, before all this has happened, our atmosphere will have solidified and life will have long since vanished.

HURRICANES ORIGINATE NEAR EQUATOR IN ATLANTIC

Tropical hurricanes, like the one that swept the West Indies lately, are long-distance travellers; for many of them originate a thousand miles east of the West Indies. The vicinity of the Cape Verde Islands, off the west coast of Africa, is one of their favorite breeding grounds, especially at this time of year.

These hurricanes all originate somewhere over the Atlantic Ocean in the tropics north of the Equator. Calm air, high temperature and humidity are the most favorable conditions for the formation of a hurricane. Such conditions are most likely to be fulfilled in the "doldrums" of the North Atlantic in the late summer or early fall. Hurricanes may, however, occur at any time of year, or in other places. They occur also in the Pacific and Indian Oceans. Those of the southern hemisphere differ from those of the West Indies in one important respect; the winds of the northern hurricanes spin in a direction opposite to the hands of a clock, while those in the southern spin clockwise.

Usually the Atlantic hurricanes travel northwesterly from their birthplace until they reach the region of the American coast, then they curve northwards, sometimes missing land completely, but menacing shipping along the north Atlantic coast.

AVIATION

FLIGHT MADE SOLELY BY INSTRUMENTS

Taking off from the ground, making a short flight, and again landing very close to a marked spot on the ground, Lieutenant James H. Doolittle, while working under the auspices of the Guggenheim Fund, made a successful test of flying solely by instruments at Mitchel Field, New York. This flight, in the opinion of Harry F. Guggenheim, president of the Fund, marks the end of the terrible fog menace. Doolittle was in a fully-enclosed cockpit, unable to see anything of the outside world. In place of the natural horizon to guide him, he had in his plane an "artificial horizon," a small instrument which indicated the longitudinal and lateral attitude of the plane with reference to the ground. With stability assured, he was able to locate the landing field by a direction-finding radio receiver. In addition to the usual long-distance beacons, there is also at the field an auxiliary beacon to enable pilots within 15 or 20 miles of the field to find their way to it. Mr. Guggenheim believes that, with these and other devices that were used for the first time, the weather hazard will vanish and, in fact, the plane will be more independent of weather than any other form of transportation. In this test Doolittle landed at almost precisely the same spot from which he started several minutes before and, though he passed very close to obstructions, the infallible indication of his instruments enabled him to map a safe and accurate course.

600-PASSENGER AIRSHIP TO BE BUILT BY BURNEY

Commander Sir Charles Burney, who is building the great British Dirigible R-100, is now working on plans for a new ship that would carry 600 passengers, besides a suitable crew. He says that even the R-100, though not yet fully completed, is already "obsolete" and that, if he had his way it would never have been built. Ships much larger than the R-100 or the *Graf Zeppelin* must be built to make transoceanic air transportation practicable. The Air Ministry, however, is of the belief that the present ships, the R-100 and R-101, must be proved practicable before larger vessels are constructed. The new ship would have a single large hull in which everything would be contained, instead of separate gondolas for the engines.

OPEL MAKES FLIGHT IN ROCKET PLANE

The first successful flight of a rocket plane was made recently in Germany by Fritz von Opel, manufacturer and sportsman, who flew a mile and a quarter in precisely seventy-five seconds at an average altitude of 49 feet. The plane, a combination of rocket ship and glider, weighed about 500 pounds when fully loaded with the rockets and carrying the pilot. After two unsuccessful attempts to get his ignition system to explode the rockets properly, Opel essayed again; he was shot along a track, on which the machine rested, and then catapulted into the air at a speed of about 85 miles an hour. Three rockets, each weighing ten pounds, were used to shoot him off the ground, each rocket burning for exactly two seconds. The rockets which carried him through the air burned for twenty-five seconds, each generating the lifting power of 1,125 pounds. The speed is regulated by the frequency with which the rockets are touched off. After all of them are exhausted the plane can glide to earth. Opel states that he certainly expects to build bigger and better rocket planes, as this effort was only a crude experiment.

BIOLOGY—EVOLUTION

GREEN COLOR IN PLANTS RELATED TO BLOOD

Solution of two fundamental problems of plant and animal life has been advanced by Prof. Kurt Noack of Bavaria, who has just shown that chlorophyll, the green coloring matter of plants, is related to blood and is derived from a substance known to biochemists as *protochlorophyll*.

"A complete understanding of chlorophyll in all its relations will aid us greatly in understanding whence we come, and whither we go," said Dr. Frank M. Schertz of the U. S. Bureau of Chemistry and Soils: "Chlorophyll is so little understood, yet it is the most important compound in all the world. It seems to be derived from protochlorophyll, a peculiar red-fluorescing pigment which is produced in seedlings grown absolutely in the dark. Photochlorophyll changes photochemically into chlorophyll upon exposure to light. Chlorophyll is an oxidization product of protochlorophyll. It is with the origin of this vitally important substance, chlorophyll, that Prof. Noack's experiments are concerned."

The work of Prof. Noack has shown very clearly a relation between the green pigment found in leaves and the red pigment of blood, although just how the blood pigment is formed from the chlorophyll has not yet been determined.

SCIENCE CANNOT EXTEND BIBLICAL AGE LIMIT

In spite of the remarkable progress in public-health practices and in medicine during the last century, we cannot hope that the span of human life will be lengthened, Dr. Louis I. Dublin told members of the American Public Health Association recently.

A study of the mortality figures since 1920 among the general population of the country and among the insured of the Metropolitan Life Insurance Co., shows a decreased ability for people to live much longer than 65 years, Dr. Dublin said.

"The *expectation* of life has increased; but the span of life has remained stationary. A fundamental distinction must be made between the two. The former, which is the average length of life of people in a stationary population, has shown appreciable gains and will continue to increase as public health improves and more and more diseases are brought under control. The latter has remained stationary for a long time and it is altogether unlikely that man will be able to do anything to change it. The span of life seems to be fixed by the nature of man himself. His internal structure wears out after so many years of work and use and he appears unable to master its weakness or give it stamina to last longer."

DOCTORS TRY TO MEASURE INVISIBLE ORGANISM

An attempt to measure the world's tiniest living organism has been made by two St. Louis scientists, Drs. D. M. Hetler and Jacques Bronfenbrenner of the Washington University School of Medicine.

This organism is the bacteriophage, a potent destroyer of bacteria. It is so small that it cannot be seen even with the aid of the most powerful microscope known to modern science. The radius of the average particle of the 'phage is approximately one four-millionth of an inch, the two scientists calculated. Even this infinitesimal particle may not be the smallest unit of the 'phage, but may serve as a carrier for still smaller cores.

The germ of typhoid fever, which can be seen under the microscope, is about six times as large. Some scientists do not think the bacteriophage is a living organism; but, whether animate or inanimate, it is so small as to be almost beyond the conception of man.

GIANT HOG WAS BIG AS AUTO

The fossil skeleton of a giant hog, which stood seven feet tall, has just been mounted in Morrell Hall at the University of Nebraska. This terrible porker in his prehistoric day was as high as the tallest modern automobile and had a wheelbase of about 140 inches.

The fossil was dug up in Sioux County, Nebraska. Only two of the giants have ever been discovered, the other being smaller than the university's specimen. The pig, scientifically termed *Dinohyus hollandi*, lived during the late Oligocene or the early Miocene age; which would give him an antiquity of some twelve million years.

AMERICAN SHEEP GROWERS FIND BREEDING INCREASES WOOL CLIP

Gland grafts for speeding up the growth of sheep and increasing the wool weight, advocated by Dr. Serge Voronoff, famous gland-grafting surgeon, have not yet been resorted to in this country, inquiry reveals. American sheep growers find that careful breeding alone increases enormously the value of their sheep and also the wool weight. No gland-transplantation experiments are being made in this country, so far as known by the U. S. Bureau of Animal Industry.

The possible economic value of Dr. Voronoff's work is considered important in European countries but, in the opinion of the U. S. Department of Agriculture officials, the cost of performing the delicate surgical operation, even if successful, would greatly offset any gain from possible increase in wool weight and meat value. However, these officials are still not entirely convinced of the success of Dr. Voronoff's experiments. Dr. Voronoff claims that by implanting the male gland of a fully developed ram in an immature ram, the development of the latter, including the wool growth, may be greatly hastened.

CHEMISTRY

NEW ALLOY GAINS TENSILE STRENGTH WHEN HEATED

An alloy that grows harder and stronger the hotter it gets, has been produced by Dr. Erwin F. Lowry of the Westinghouse Electric and Manufacturing Company. This alloy has been named *honel*, and is a combination of cobalt, nickel and ferro-titanium. This alloy because of the immensely smaller cost is now replacing platinum-iridium in the manufacture of radio tubes. Platinum-iridium has been used for radio tubes because it does not react to a coating of oxidation. It is stated that, although *honel* has been found to oxidize slightly, the reaction from the resultant coating is beneficial to it. Most metals grow softer and lose their tensile strength as they are heated but, Dr. Lowry is reported to have said, he found that "*honel*, heated to 600 degrees Centigrade, which is approximately 1,100 degrees Fahrenheit will withstand a pressure of 60,000 pounds to the square inch. Further tests show that *honel* is tougher and harder when heated to 1,800 degrees Fahrenheit."

DIAMONDS MADE FROM SUGAR

Displaying a diamond before the American Chemical Society meeting at Minneapolis, Professor J. Millard Hershey, of McPherson College, Kansas, declared that it is a real diamond which he had made from ordinary pure table sugar, subjecting it to a pressure estimated at ten tons to the square inch. The diamond is no larger than a grain of sand; but Prof. Hershey stated that it is the largest man-made diamond in the world, being four times the size of that produced during the last century by the French chemist, Moissan, whose methods he had followed. It was explained that the diamond was formed by melting iron filings and sugar in graphite crucibles about the size of a man's fist, which were cooked in an electric furnace at temperatures reaching nearly 5,000 degrees Fahrenheit. When hot, they were plunged into ice-cold brine, the theory being that the great pressure created by fast cooling would result in the carbon of sugar changing to diamonds, which are only pure carbon crystallized. The iron balls were next treated in various acids, which after a week had dissolved all the solid matter with the exception of some dust, which was the carbon product obtained from the sugar.

"Science News of the Month"

portrays in plain yet concise language every important scientific advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 42 scientific journals as well as a score of other sources are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, etc.

AUTUMNAL EFFECTS ON FOLIAGE PRODUCED BY ALCOHOL

It is not frost which gives leaves and foliage their beautiful autumnal coloring, but the alcohol which ferments in them, says Samuel G. Hibben, lighting specialist of the Westinghouse Lamp Company, according to the *New York Times*. Mr. Hibben, speaking before the Illuminating Engineering Society, explained that foliage absorbs certain colors of the spectrum and reflects the rays it can dispense with. Leaves resemble individuals, he said, inasmuch as they have their certain habits and a normal cycle of life. At the turning point of their lives chemical action takes place, and they lose their powers of absorption. Their chemical composition changes when alcohol appears, and the leaves gradually become red. Mr. Hibben also remarked that the world's food supply is secure as long as there shall be an abundance of cheap electricity; because it is possible to duplicate the sun's rays in enclosed gardens and permit vegetables to thrive. With the aid of electricity, he said, it is possible to produce vegetables and flowers throughout the year in cold latitudes.

TWIN DISCOVERED FOR CARBON

Carbon is the latest chemical element to be shown to have a twin. Last winter two California physicists showed that oxygen, long supposed to be single, was not only double, but triple. Now Dr. Arthur S. King, of the Mt. Wilson Observatory, and Dr. Raymond T. Birge, of the University of California, have found a kind of carbon that is heavier than the ordinary form. Carbon is one of the essential elements of all living matter.

These experimenters heated carbon in a vacuum, with an electric furnace, to a temperature around 5,000 degrees Fahrenheit. When the light that it emitted was analyzed with a spectroscope, the usual bright bands of the spectrum appeared, including a very prominent red one. Close to this, however, the photographs showed another, very faint, and previously unknown.

The atomic weight of ordinary carbon is 12. King and Birge announce that the new band can be explained by the presence along with ordinary carbon of another kind, or isotope, of atomic weight 13. They are unable to estimate the relative proportions of the two kinds; but the heavier isotope must be present in very small quantities, for the band is hundreds of times fainter than the strong one.

GEOLOGY

COMMERCIAL RADIO STATION CHECKS TIME OF EARTHQUAKES

The dots and dashes of radio transmission from an ordinary commercial station are now used to check the times of earthquakes. At the Seismological Laboratory of the California Institute of Technology in Pasadena, the radio messages from the station are continually received, and recorded by a flashing light on a revolving sheet of photographic paper. An accurate clock is recorded on the same sheet, so that the exact time of any dot or dash may be determined.

Scattered throughout southern California are a number of other cooperating seismograph stations, at each of which is a similar automatic radio recorder, continually taking down the messages of the station. A clock, in which accuracy is not essential, records its ticks on the same sheet with the radio records. The same clock makes similar marks on the sheet on the seismograph drum, where the earthquakes are recorded.

In use, this permits the seismologists to tell the exact time at which the earthquake waves reach any station. For instance, suppose an earthquake record begins while the station is sending the word "ship." At Pasadena the record starts on the letter "s", while at Santa Barbara it begins on the letter "h". As the signals arrived at both stations simultaneously, the difference is due to the greater time it has taken the earth-wave to travel to Santa Barbara; and from the records of the standard clock at the central station this time may be precisely measured.

From the studies thus being made, it is planned to detect even the slightest tremblings of the earth in this region. From this it is hoped that enough may be learned of the dangers; so that proper precautions can be taken to prevent damage by earthquakes, or that a severe quake may be predicted sufficiently far in advance to prevent loss of life.

THREE BRIEF ERUPTIONS SPOUT MILLIONS OF CUBIC FEET OF LAVA

The volume of lava from a volcano, even in short-lived eruptions, is indicated by calculations by Dr. Howard A. Powers, of the Hawaiian Volcano Observatory. A cubic box, one and one-sixth miles on each side, would be required to hold the lava left in the inner pit of the Kilauea volcano in the three brief eruptions since 1924. These figures have enabled the volcanologists to predict another eruption this fall.

In the period since 1923 a total of 2,292,000 cubic *yards* of solidified lava has been left in the pit, filling it to a depth of 210 feet. From these data, Dr. Thomas A. Jaggar, director of the observatory, has formed the opinion that "the intensity of gas action and the fluidity of flowing lava increased in 1929, and at the same time the interval between outbreaks has decreased. The next inflow of lava should take place some time between now and November, 1929."

MEDICINE

DRIED HOG STOMACH NEW ANEMIA REMEDY

Dried stomachs of hogs are soon to vie with livers as the saviors of sufferers from pernicious anemia. This newest anemia remedy, made from one of the few unused parts of hogs, has just been developed and announced by Drs. Cyrus C. Sturgis and Raphael Isaacs, of the Simpson Memorial Institute for Medical Research of the University of Michigan, and Dr. Elwood A. Sharp of the Department of Experimental Medicine of Parke, Davis and Co.

An ounce of extract from the dried, ground-up stomachs of hogs is as effective a remedy in pernicious anemia as a pound of raw liver, or three ounces of the most concentrated liver extract yet made.

FINDS NEW SOURCE OF FEMALE SEX HORMONE

A readily available source of the female sex hormone has been discovered by Dr. Siegfried Loewe of Dorpat, Esthonia, formerly of the University of Gottingen, Dr. S. Ascheim of Berlin and Dr. Bernhard Zondek of Friedrich Wilhelm University.

Animal extracts of this hormone have been found to be of considerable value in treating certain disorders in women and girls but there has been difficulty in obtaining them in sufficient quantity. The presence of the hormone in rather large proportions in the secretions of expectant mothers, brought to light by the German scientists, opens up new possibilities in studying this new factor in medicine.

Several of the leading German chemical firms are said to be endeavoring to obtain connection with women's hospitals to insure a source of supply of the hormone to be developed on a commercial scale.

FRESH AIR BETTER THAN ULTRA-VIOLET RAYS

At present there does not seem to be positive evidence that artificial-light treatment is beneficial in cases of ordinary convalescence. In England, ultra-violet light treatment has been frequently advised; but the Medical Research Council suggests that probably in many cases the treatment is neither necessary or desirable.

Dr. Helen Mackay has made careful observations of the effects of ultra-violet light on the health of some delicate children from the East End of London. They were given cod-liver oil to prevent or cure rickets, and it was noticed that the results of the artificial light were wholly negative. The children receiving the light treatment showed no gain in weight or height, nor were they observed to improve in spirits. They actually had more minor ailments, such as colds, than the untreated children.

HEART KEPT BEATING 12 HOURS AFTER DEATH

How a combination of artificial respiration and adrenalin kept the heart beating for twelve and a half hours in a patient who showed no other sign of life, has just been reported to *The Lancet*, the leading British medical journal, by a Liverpool surgeon, Dr. J. Bagot Oldham. While the heart action could be sustained by these measures, the breathing could not be started.

The patient collapsed at 1:00 p. m., shortly after undergoing a delicate brain operation. For forty minutes artificial respiration was kept going by the house surgeon but, since breathing did not commence, the patient was declared dead. Dr. Oldham was then called and, after a pause of ten minutes, artificial respiration was again started, with injections into the heart of adrenalin, which contains the powerful principle of the adrenal glands. Twenty-seven injections were made between 1:50 p. m. and midnight. The heart continued to beat feebly until 1:30 a. m. Artificial respiration was then stopped.

"After each injection the heart beat strongly for ten or more minutes, and then gradually faded away, only to come back promptly after another injection," Dr. Oldham reported. No other sign of life was elicited.

PHYSICS

FREE ELECTRICITY FROM THERMO-COUPLES?

The Italian Government is testing the invention of an engineer at Brescia, Italy, to obtain electricity from the air without cost. The name of the inventor and particulars of the discovery are held secret pending the tests, but it is said that the device is based upon the thermo-electric effect. That an electric current is produced when certain metals are paired together, and the metal junctions kept at different temperatures, has been known for many years, and various metals may be employed for the purpose. The inventor does not claim that his invention will produce large amounts of power as cheaply as generators; but that it does produce small amounts at practically no cost. The invention will probably use a large number of metal pairs forming the thermo-couples which will be combined in larger units, to produce a large voltage. It is proposed to place one set of the metal junctions in cool ground or cold water and have the other set exposed to the air. In the daytime the air will be warmer than the earth or water, thus causing the current to flow; this flow will not cease at night: because then the air will be cool and the earth or water warmer. Thus a continuous flow of electricity may be obtained. The most important advantages of this system are that it requires no attendance and is subject to very little deterioration, except corrosion.

GASOLINE AND OIL PRODUCED ELECTRICALLY

The making of gasoline and oil by electricity is a discovery disclosed at the meeting of the American Chemical Society in Minneapolis, according to the *New York World*. This was the result of experiments conducted by Prof. S. C. Lind and Dr. George Glocker of the University of Minnesota. An electric current is switched through the free gas that escapes from oil wells, which is thus converted into either gasoline or oil. This new process does not require the use of fire or heat. The apparatus is similar in appearance to a kitchen cooker and the gas is kept flowing through it. It has a glass container, wrapped with black electrical tape and carrying an inner tube that conducts the electricity. A current of small power, with a potential of 1,500 volts, is turned on, and the oil or gasoline gathers at the bottom in the proportion of about one quart for eighty gallons of gas. The production of some oils may be increased by the use of this method; but it is not expected that gasoline can be made any cheaper.

THE PROJECTION OSISO PERMITS "SEEING" MUSIC

A device which has been named "projection osiso" allows the "seeing" as well as hearing of music. This instrument is the work of William B. White of the American Steel Wire Company, in collaboration with the Westinghouse Electric and Manufacturing Company. The "projection osiso" gathers in the sounds by means of a microphone and changes them into light waves, placing them at a given point in their proper order on a grayish screen. Sixteen revolving mirrors cause the light waves to appear as a straight line when the attachment is resting. When the piano is struck the line begins to ripple, the shape of the ripple depending on the tone. This instrument will assist materially in the construction of pianos and other musical instruments, according to Mr. White, as it is only necessary to watch the screen to observe visually the effects produced by different types of playing. The visual interpretation could also indicate when there was some peculiarity in the piano's construction. Musical students may also be assisted in their instruction by the "projection osiso"; as it will be possible to see the waves produced by great artists, which although impossible to follow exactly will give a good idea of their interpretation of the music played.

TRANSATLANTIC TELEPHONE CABLE BY 1932

Early in the year 1932, it will probably be possible to talk from the United States to Europe by telephone regardless of the static and atmospheric conditions that interfere with transatlantic radio at times. By then it is expected that a transatlantic telephone cable will be in use, providing an all-wire voice circuit between the two continents.

RADIO-TELEVISION

MECHANICAL EYE SEES IN THE DARK

The invention of a mechanical eye, or "noctovisor," by John L. Baird, of Dunhill, England, will permit one to see objects in fog or darkness the same as in broad daylight. The inventor, in explaining his device, said it is in reality a television receiver coupled to a television transmitter which is designed to operate with invisible infra-red rays. The lens of the noctovisor resembles that of a camera, catches the invisible image in infra-red rays and casts it upon the exploring disk of the transmitter. The receiving apparatus is in the same box, and reproduces the image simultaneously, but in visible light. The invisible infra-red rays penetrate fog, as well as hard rubber, bakelite and other substances, which partially or wholly resist the shorter visible rays, and are halted only by wood.

THEREMINS TO BE SOLD TO PUBLIC

The Theremin, a radio-wave musical instrument invented by Professor Leon Theremin, is to be manufactured by the Radio Corporation of America which has purchased the rights to it. The source of sound is a loud speaker, operated by alternating current of variable frequency, which is generated in the instrument. The music is produced by simply waving the two hands before the projecting metal parts of the instrument, one hand controlling volume and the other tone. The theremin has an entirely new "tone-color," resembling that of a violin or cello. It requires no musical training to operate, having no scale; and skill in performing will come with practice and innate musical inclination. The first models will probably sell at $175.00.

BORNEO TO SPEAK WITH BYRD BY SHORT WAVE RADIO

The jungles of Borneo will soon be talking with the icy wastes of the Antarctic continent where Commander Byrd's men are wintering. Borneo has already talked with Washington and Chicago, by means of a short-wave radio set in the hands of the outposts of the All-American-Mohawk Malaysian Expedition, now far into the jungles of the world's largest and least-known island.

VOICE AND IMAGE TO GO OVER AIR SIMULTANEOUSLY

A demonstration of the transmission of clear television images and the voice over wires was made between the studio of the Baird Television Corporation in the Paramount Building, New York, and a special laboratory in the city, under the direction of Captain W. J. Jarrard, representative of the Baird interests in America. The apparatus was assembled here following the system employed in England by John L. Baird, Scottish inventor. Captain Jarrard stated that television is now to become a reality on the radio in England, and, in view of the accord between his company and the British Broadcasting Co. and the British Postoffice (who had hitherto been adverse to making practical demonstrations of television on the grounds that it was not sufficiently developed to serve the public) rapid development of television may now be expected. In the tele-talkie, as the apparatus is called, the sound is transmitted over one wave and the images over another. The images, in the New York demonstration, were clear enough for the observer to read newspaper headlines a quarter of an inch in height.

RADIO ABSOLVED AS WEATHER DISTURBER

The rush of radio waves through the ether has not made Paris hotter or colder, dryer or rainier than in the years before the invention of "wireless," Joseph Sanson, French engineer and meteorologist, has concluded as a result of a study of weather records for the past two centuries. To determine the validity of claims that radio does influence weather, he traced unusual weather reports and found that for France, at least, the same sort of irregularities that have been evident in the decade since the wide use of radio were equally present in former years.

RADIO COMMUNICATION BETWEEN PLANETS MAY BE POSSIBLE

Professor Carl Stormer last winter disclosed that radio echoes were received by him after being delayed for considerable periods of time from the sending of the original signals, according to Professor H. H. Sheldon in the New York *Herald-Tribune*. This would seem to make it possible to send signals to other planets. Previous experience indicated that there is an ionized blanket, the "Heaviside Layer," surrounding the earth in its upper atmosphere, through which radio waves could not pierce. From the experiments of Professor Stormer, it is surmised that this blanket had been pierced and the waves were reflected by an electron cloud in outer space. If this is not so, the waves then must have passed around the earth several hundred times to account for the long intervals of delay. If the former supposition is correct, and radio waves actually leave the earth and return, a new field will be opened for experiments, whose findings should prove of great interest.

GENERAL

CURLING UP LIKE KITTEN RELAXES SLEEPERS

Movies taken of sleepers indicate that the greatest possible relaxation occurs when the individual coils himself like a kitten and when he sprawls out like a swimmer. This new evidence on sleep is announced by Professor S. R. Hathaway of Ohio University and Dr. M. M. Johnson, of the Mellon Institute, Pittsburgh, who are conducting a lengthy investigation of the phenomenon.

Sleepers who took part in the experiment were blindfolded to avoid disturbance from light, and were photographed in various poses by a motion picture camera. A typical subject took nine different poses in the course of about eight hours' sleep, and shifted from one position to another 33 times. All of the preferred positions required some supporting strain; and the experimenters discovered that about half the time is spent in postures which are mirror-images of others, thus resting the muscles that have been strained in previous poses.

300-STORY BUILDING POSSIBLE BUT NOT ECONOMICAL

On a plum of New York City realty, where the land is worth $200 per square foot, a 60-story building will yield the greatest return on the investment. With the land worth $400 a square foot, which is more nearly the value of land in the Grand Central Terminal region, a 75-story building will pay best. The engineering difficulties of a building as high as 2,000 feet, or nearly 200 stories, could be overcome; but such a structure would not be economically feasible. Even a building of 131 stories would not return any net income.

These are some of the principle conclusions drawn from a study that has been in progress during the last two years, under the direction of W. C. Clark, New York economist, for the American Institute of Steel Construction. Many arguments have been advanced on both sides of the skyscraper question; but the Institute recognizes that the decisive one is, whether or not ultimately, the tall building is more profitable than the low one.

From an engineering standpoint, Mr. Clark stated, buildings could be built 2000 feet high.

CAR OF THE FUTURE TO BE LIGHTER AND FASTER

That motor cars ten years hence will be lighter, faster, more graceful in line and probably gearless, is the opinion of Captain Malcolm Campbell, the famous driver, writing in *Tit-Bits*. Motor-car development is trending towards lighter and faster models although, he says, one will have to be sacrificed to the other; since a car cannot travel at high speeds without sufficient body-weight. The most important improvements will be improved body design, improved cutting, fewer angles and more stream-line, smaller engines, the doing away with gears, and a better method for excluding gasoline fumes from closed cars. But the gearless car, which will avoid the annoyance of continually changing gears, will be the next step forward, he remarks. Beautiful stream-lined bodies will be on all cars of the future, he said.

EFFECT OF EXERCISE ON RODENT INTELLIGENCE STUDIED

Experiments by Professor Coleman M. Griffith and Professor S. M. Morey of the University of Illinois, to discover whether the scholastic standing of students is impaired by their participation in sports, were mentioned at the ninth International Congress of Psychology. The subjects used in the experiments are white rats. Two groups of the rats are being studied. One group is being systematically put through a course of exercises corresponding to the amount of energy expended by a college athlete. The other group will be kept in a cage permitting a minimum amount of exercise, presumably to represent sedentary students. Each subject is weighed daily and the weights are correlated with the amount of exercise and rate of learning. The rodents after their "season" will be sent through a maze and will be rated by the number of errors they make, the total time spent in the maze, time spent in movement in the maze, and time of relearning after an interval of two weeks. Both groups will also be exposed to disease in order to learn which is more susceptible. Professor Halsey Cason of the University of Rochester also read at the meeting a rating in mathematical terms of common annoyances to humanity, such as mosquitoes, harsh treatment of children, etc.

MEN OF SCIENCE HAVE ADDED TO WORLD'S HAPPINESS

Responding to the statement made by a Yale professor, that he could not see wherein "science is doing anything for our intellectual life; and, in so far as it attempts to force its methods and results on the intellectual world, it is doing an injury and not a benefit," Professor Palmer C. Ricketts, president of the Rensselaer Polytechnic Institute, answers in the *New York Herald-Tribune*, that men of science have always been among the greatest thinkers of their times and, without reasonable question, the greatest benefactors of the race. He says that, through the efforts of men of pure science and of engineers, in bringing about improved means of communication and transportation there results the difference between savagery and civilization, between ignorance and enlightenment. At the risk of their lives, these men have often opened new paths for the speculations of their contemporaries. Ever since the beginning, he says, the men of pure science and the engineers have, by their work, added to the sum of human knowledge and human happiness—added to the intellectual life as well as the material life.

MENTAL PRONUNCIATION RETARDS READING

Walter B. Pitkin, professor of Journalism at Columbia University, who very recently published a book entitled, "The Art of Rapid Reading," has given his opinion, according to *The New York Times*, that the most rapid reader is he who reads wholly or almost wholly with his eyes, making no mental pronunciation of the words read, and that the American business man talks too much and reads too little in the transaction of his affairs. Professor Pitkin said that business men rarely average more than 90 words per minute in speech; whereas, if properly trained, they could read 300 to 500 words of serious matter per minute. This is because they have not been taught to read properly, which is due to the fact that most of us are instructed in reading at the same period of our lives while we learn to talk. We are encouraged by teachers to read aloud; the result is that our reading is a form of talking to ourselves, which slows up our reading.

Science Questions and Answers

Why Is It Colder in Winter?

Editor, Science Questions and Answers:

Will you please answer the following:

1. Just what is meant by "light" and "light-years"?

2. What do you mean by the Coolidge tube?

3. Does Einstein's Theory say that it is possible to see around corners?

4. Why is it, when the sun is nearer to the earth in winter, that it is colder than in summer?

John F. Healy,
Boston, Mass.

(1. Light is the form of energy which renders visible to our eyes the objects from which it comes. A light-year is the distance that could be covered by a beam of light travelling at 186,000 miles per second for one year. It is equal to approximately 6,000,000,000,000 miles. Therefore, if an object is said to be one light-year away it is meant that it is six million million miles away.

2. The Coolidge tube is a vacuum tube capable of withstanding very high voltages. In the ordinary vacuum tube, used in a radio receiver, the filament is a "cathode"; that is, it gives out electrons which are drawn toward the tube of the plate by the 22 to 425 volts of positive charge on the plate. In the Coolidge tube, of most recent design, a charge of 900,000 volts draws the electrons from the cathode. By this means, it is possible to give the electrons a speed estimated to be as high as 150,000 miles a second. After passing the "target" at this speed they continue and form a "ray," which will pass through the walls of the tube into the open air. The action is similar to that of the ordinary Roentgen or X-ray tube, but much more powerful. The rays from the Coolidge tube cause gases to become solids, minerals to glow for hours with "phosphorescent" light; and profound alterations in the cells of living bodies are produced. If the voltages now used could be doubled, it would be possible to produce "gamma" rays such as those thrown off by radium.

The details are shown in the accompanying illustration.

3. Not precisely that. The Einstein theory merely states that light waves are attracted to a large mass and therefore bent from their path toward the mass. Thus the light from stars coming to us is bent towards the sun and the stars seem to be in different places from where they really are. However, if bodies of sufficiently large mass were placed near the path of light rays, they might by their attractions bend the rays in almost any direction. But, considering the small angle of bend occasioned by our great sun, it is doubtful if any body in existence is sufficiently large to cause a great bend. However, science may achieve a new method of bending rays, as Harold Sykes indicated in his "Beacon of Airport Seven" in the July issue of AIR WONDER STORIES.

4. It is not the distance of the sun from the earth that causes winter; but the fact that during the winter months the north pole is tipped away from the sun, the north pole is in darkness, and the sun's rays strike the northern hemisphere obliquely instead of squarely. Therefore the concentration of the sun's rays in our northern hemisphere is much less on December 21 than on June 21, when the north pole is tipped towards the sun. The same effect can be observed by holding a light before an object and allowing the light to shine squarely on it. Then move the light so that it is closer, but shines on the object from an angle. If the difference in the distance of the light in the two cases is not too large it will be observed that in the first case the object will receive more concentrated light. The position of the earth on June 21, when the north pole is tipped toward the sun, gives the Arctic region 24 hours of sunlight and the northern hemisphere has its period of most concentrated sunlight. This is made clear by the accompanying illustration.—Editor.)

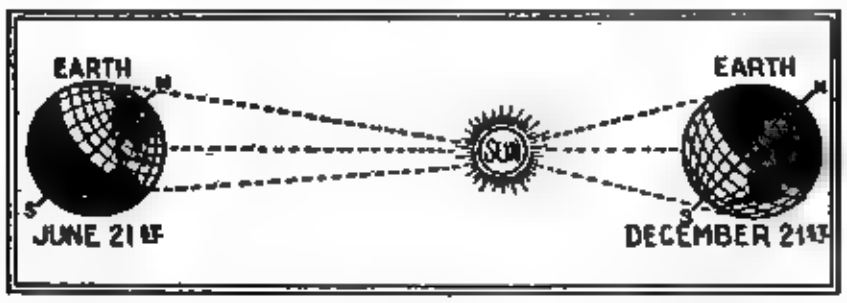
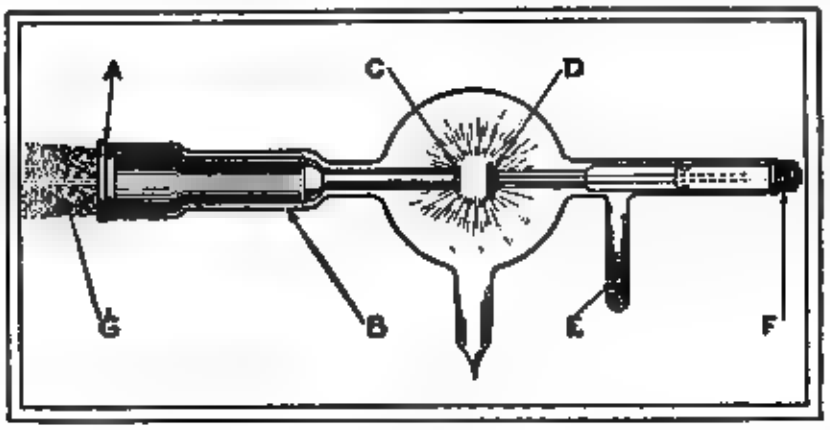


Illustration of the positions of the earth on June 21 and December 21, showing how by relative angles of the northern hemisphere to the sun's rays summer and winter are produced.



The Coolidge Tube. A—The door emitting a flow of electrons. B—A metal shield protecting the glass from the stream of electrons. C—The target for the electrons. D—The cathode emitting the electrons. E—Charcoal to absorb all remaining gases in the tube. F—Screw to put tube into a power socket. G—Stream of electrons.

About Interplanetary Travel

Editor, Science Questions and Answers

I am very much interested in the advancement of modern science, especially the subject of interplanetary travel, and I would like to ask a few questions on it.

First, considering that the time for a voyage to our nearest planet may take from two to two and a quarter years, how would a traveller in space carry enough air for such an extent of time, also, what kind of food would be carried and in what form?

Also, this weight along with the possibly enormous weight of the fuel would make the machine enormously heavy, would it not?

Is it possible that the cause of failure of Professor Goddard's rocket was due to the atmospheric pressure inside against the complete vacuum of outer space?

I will appreciate very much an answer to these questions.

E. S. Long,
465 E. 183rd St.,
New York.

(Voyages to distant planets that take as long as two years will not be undertaken until science has advanced far enough to provide a traveler with the necessities of life, en route. He must have oxygen and food. The oxygen will doubtless be carried in solid form and the food as concentrated tablets. Such voyages will not be made until the ships can be made large enough to carry the equipment necessary. However, the size of the ship is not important; for what is most necessary is to find a fuel with great power per unit weight. If this is not found then there will never be an interplanetary voyage. If it is found then a ship may be made practically as large as one wishes. All that is necessary is to carry more fuel.

Professor Goddard's experimental rocket, fired recently, did not penetrate to outer space. Professor Goddard did not try to send it beyond the earth's atmosphere. He was merely experimenting. And his experiment, contrary to the newspaper reports, was not a failure, for it accomplished what he wished of it.—EDITOR.)

Maximum Speed Due to Earth's Attraction

Editor, Science Questions and Answers:

A falling object gains constantly in speed. Suppose an object were carried far out into space and then permitted to fall toward the earth. Assuming that the earth were the only body in the heavens, if the object in question were removed far enough away from it, then it would seem that it would acquire on striking the earth a speed greater than that of light. What is the fallacy here? I have understood that the speed of light is the greatest possible.

Chester W. Hodgson,
84 Washington St.,
West Orange, N. J.

(The fallacy is that, the further a body is removed from the earth, the less the attraction the earth has for it. The attraction varies inversely as the square of the distance from the earth. So, although near the earth's surface a body would be accelerated in velocity per second 32.2 feet every second, if it were removed 4,000 miles above the earth's surface that acceleration per second would be reduced to about 8 feet per second (or one quarter of 32.2). If the body were removed one million miles away, the acceleration of its velocity at that point would be only .000515 feet per second. In other words, if the body started from rest one million miles away, at the end of the first hour its speed would be only 1.8 feet per second.

Our editors working out this problem by calculus have found that there is a limiting velocity that a body will always approach, but never quite reach, no matter how far it is removed from the earth's surface. If the body were removed a billion billion miles and then dropped to the earth [assuming the earth were the only other body in existence] the velocity would not reach 7 miles a second. The formula derived for this is Velocity $= 7\sqrt{\frac{L-4000}{L}}$ In this case L is the distance of the body from the center of the earth when it starts from rest, and 4000 is taken roughly as the radius of the earth in miles. As $\frac{L-4000}{L}$ will always be less than 1, the velocity will always be less than 7 miles a second.—EDITOR.)

(*Continued on page* 658)

IN this department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories, or if the editorial board slips up occasionally, it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old-fashioned brickbat. All are equally welcome. All of your letters, so much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

Areas of Time in Thirty Minutes

Editor, Science Wonder Stories:

I have just finished reading "In Two Worlds" by Edward E. Chappelow in the October issue, and I enjoyed it very much. However, it seems to me that there is one circumstance overlooked by the author. Ted Nelson speeds up his senses until the electron of the atom appears to travel around the nucleus at a speed similar to that of the earth in its orbit around the sun. In other words, he changed the relative value of time. He set the circuit-breaking device for thirty minutes and watched the electrons seemingly slow down as his senses were speeded up. The electron was whirling around its nucleus millions of times a second, yet his senses perceived them as traveling very slowly. However, the circuit-breaking device brought him back in thirty minutes and it seems that only thirty minutes had passed on the electron; whereas areas of time should have passed. If I am in error you will please pardon me for the criticism.

Duane W. Dalgleish,
Middleton, Michigan.

(We admit the justice of Mr Dalgleish's criticism of "In Two Worlds." Inasmuch as the experimenter's sensations were speeded up so that he perceived a whirling electron as stationary, what took him thirty minutes should have taken only an infinitesimal small fraction of a second. Or conversely, as Mr. Dalgleish rightly points out, if he really was under the influence of his apparatus for thirty of our minutes, many aeons would have passed in his little atomic world during that time.—*Editor.*)

The Fakir a Faker

Editor, Science Wonder Stories:

Greetings:

In connection with a question that appeared in your magazine, asking how East Indians could suspend people in the air, may I take the liberty of "horning-in"?

A fakir is a faker, first, last and all the time—the name alone gives the lie to all that they "do".

Tourists have been coming back ever since the mythical Ark and telling the stay-at-homes of the remarkable, supernatural feats of the fakirs. What they saw is what they wanted and expected to see; and, because friend fakir was "in the business," he did his best to satisfy them and build up his reputation and trade at the same time. They saw, but did not observe, and sleight-of-hand, hypnosis and self-hypnotism will always play strange pranks on the gullible (and on the wise one also!!)

Could the fakir actually suspend the law of gravity by any means whatsoever, he would not waste his days in the daily parade of his "mystic powers" but would impart his esoteric knowledge to some power company, or other suitable organizations, and name his own figure in consideration. It would, however, be doubtful if the purchaser would long enjoy the benefits of the knowledge; for the fakir would probably start a sure-thing monte game and win it all back again.

I have figured out how the fakir makes a rope stand upright, extending out of sight, and then has an assistant climb up (or climb down if he was up there first!) Upon first discovering this I was going to get a patent; but for the benefit of humanity I am going to divulge the secret—it is this—he uses sky-hooks!

Yours until perpetual-motion short circuits gravity.

E. A. Durmer,
Hasbrouck Heights, N. J.

(We are not quite so ready as Mr. Durmer to call the "fakir" a faker. The suspension of any one in the air does seem contrary to our generally-conceived notions of the laws of nature. Yet, as Gilbert Chesterton once said, it is possible to throw a lot of stones up into the air and they will hold each other suspended by their mutual tendency to fall. *The answer is the arch.*

So on the question of fakirs as on all other phenomena of its kind we are exceedingly open-minded—desperately anxious to be shown.—*Editor.*)

As One Profound Thinker to Another

Editor, Science Wonder Stories:

How, as a profound thinker, come you to propound in your editorial "The Wonders of Space" in the August issue—otherwise most admirable—the absurdity that space must have existed before matter?

Perchance the answer suggests itself in the equally ridiculous question that follows: how was matter originally *created* out of the vast nothingness?

It may be just possible that the set of Judaic idiocies which are being so successfully sold to this nation in the shape of various brands of so-called "Christianity" have been stamped upon your mind at a tender age, and you cannot altogether get rid of the tenets of a totally irrational faith.

Let us suppose—just suppose—that the world had never been created, that it is the scene of constant change, one thing evolving into another—everlasting transformation—no beginning, no end; now how can one element of the whole exist before another?

We supposed, of course, as in the case of infinity, if eternity is not the truth then what happened before the beginning?

As a profound thinker to another, Mr Gernsback, have you studied Descartes' method? It is rather important to apply Descartes' method before proceeding very far with profound thinking, if one wants that thinking to be rational.

Having read Descartes' method, a study of Buddhism and Taoism might not be amiss. The gentle heathen may, as he claims to the vast astonishment of missionaries, have a better religion; at any rate one that is strangely *scientific.*

And finally, as a beginning towards things more intricate, the three fundamental principles of Occult Philosophy might be considered, weighed and meditated upon:

1. Seven is the Perfect Number.
2. The Microcosm is a copy of the Macrocosm.
3. All phenomena have their origin in vortices.

The first may seem somewhat arbitrary, though there are reasons for its existence.

But the second and third, these have been enunciated a long time ago. I knew them by heart twenty-five years ago and they were old then. Does Einstein bring anything new to the world?

Study the microcosm—the mysteries of the macrocosm grow clearer. This may apply to many things: the atom—molecule—stars and planets or sleep and awakening versus life and death.

The ocean cannot be poured into a mere shell and the whole truth of the universe crammed into the human mind. To an apparently finite being, having seemingly a distinct beginning and end, the awfulness of eternity in time and of the infinite in space is beyond comprehension. But what should be still more beyond comprehension is the idea of a general beginning, of a creation of the whole or part of the whole, of boundaries to this whole, of one part of the whole suddenly appearing from nowhere in particular—of a complete void to-day and to-morrow something in that void. From where comes this matter in pre-existing space? How?

Just *on parenthesis* this being something of a *Salade Russe* of Profound Thinking.

Does Einstein really claim that he invented the theory that magnetism and gravity are one and the same thing? I understood that when ten years of age.

Also:

Has it ever occurred to you that—the macrocosm being an enlarged microcosm—to reverse the principle—our whole planetary *system* revolves around an enormous sun entirely beyond the reach of the most powerful telescope. Hence comes the idea of cosmic rays, curvature of space and the greater speed of star systems further from the center.

Eugene Clement d'Art,
3 LaWrence St.,
Flushing, L. I., New York

(As one profound thinker to another, we must call Mr d'Art's attention to our editorial in which we state that "space must have existed before matter". That is certainly the logical deduction to be drawn, if we are to be as presumptuous as to draw any deductions. If we are oppressed by our infinitesimal status and the awfulness of eternity, we must leave the subject alone. But as a matter of speculation, in which case the human mind may dare anything it pleases, it is difficult to believe that the *contained* existed before the *container.* The only other assumption is that matter and space came into being simultaneously. In this case we assume, not a series of steps of creation reaching back into infinity, but a single creation (therefore of finite time) in which the speck of dust that was to become the universe of matter and space with all their potentialities came into being. Our own belief is that we must go back to infinity to find the beginning. And this to us presupposes as we have indicated a progressive creation, first of *space* and then of *matter.* From the relationship between the two we arrive at *time.* We are very glad to get opinions on this subject from our readers.—*Editor.*)

(*Continued on page 661*)

NOTICE TO READERS

Due to the great influx of letters, we were unable to print all of those received in this department. A great number of letters have therefore been printed in "The Reader Speaks" Department of [illegible] QUARTERLY, which is now on sale at all newsstands.

Science Questions and Answers

(*Continued from page 656*)

Do Electrically-Charged Bodies Weigh More?

Editor, Science Questions and Answers:

1. Does any body weigh more or less, even slightly, after being charged with electricity than before it received the charge?

The point is, I am under the impression that a body to be charged positively or negatively must have added to it or taken from it negative electrons. If these electrons have mass, as physicists assert, the weight of any charged body should to some degree be affected.

2. What is published concerning the cosmic ray from a physicist's point of view; that is, technical information, not stories?

J. K. Sanborn,
Boulder, Colorado.

1. Physicists are not agreed on this point. What they do say is that an atom is composed of a positive nucleus and negative electrons. It would take about 1,850 negative electrons to make the mass of one atom; from which we may conclude that the greater part of the mass resides in the positive nucleus. Therefore, if an electron is added or removed it would seem that the weight of the body should be changed; but the amount of change is so infinitesimal in proportion that we cannot measure it. It has been found, however, that magnetization does change the length of bars of iron, steel, cobalt and nickel.

2. Recent articles by Robert A. Millikan are physicist's treatises on the cosmic rays. They appear in the Physical Review of February, June and October, 1928, and the Scientific American of June and August, 1928.—EDITOR.)

How Large Is Death Valley

Editor, Science Questions and Answers:

Your magazine, SCIENCE WONDER STORIES, in view of its excellent start, has a marvelous future ahead.

Just two questions and I am through. How large is Death Valley, Arizona? What is the distance of Sirius from our solar system? The "Science News" section is a very good idea. Hold on to Paul. The magazine is incomplete without his cover.

Jack Delmonte,
330 Wadsworth Ave.,
New York City.

(Death Valley is in California, and is 150 miles long by 10 to 25 miles wide. It is 216 feet lower than sea level and the lowest point of dry land in the United States.

Sirius is 9 light-years or about 54,000,000,000,000 miles from the sun.—EDITOR.)

Sodium Iodide Formed

Editor, Science Questions and Answers:

I was experimenting with some chemicals recently, and I happened to place some sodium carbonate in iodine. I allowed it to remain for about twenty-five minutes. At the end of that time I noticed that the iodine had turned white. After filtering off the sodium carbonate, I had white iodine. Can you explain [redacted]?

V. Golden,
1089 Eastern Parkway,
Brooklyn, N. Y.

(What was obtained was a characteristic reaction between the sodium carbonate and the iodine to form a new compound. The compound that appeared to be "white iodine" was sodium iodide, a white soluble salt. All the iodine was combined with the sodium to form the new compound, and none of the original iodine was left "free." The reason why some sodium carbonate was left was that there was too much to combine entirely with the amount of iodine. If the proportions of the two are correctly measured and there are 127 units by weight of iodine to 53 units of anhydrous sodium carbonate and if they are mixed in water, a weak acid called carbonic acid will be formed as well as sodium iodide. All the original carbonate and iodine will disappear.—EDITOR.)

Why Doesn't Water Burn?

There is a question I'd like to ask. If oxygen supports combustion and hydrogen itself burns, why doesn't water burn?

Henry Becker,
Bronx, N. Y.

(Our correspondent's question is based on a misunderstanding of the expression "to support combustion," which was coined by scientific men in an early day when the nature of the chemical action had not been correctly determined. "Combustion" in the ordinary sense of the word, is the union of oxygen with some substance, such as carbon [coal], wood, or gas. Ordinary fuels contain carbon and hydrogen, in different proportions. When the oxygen of the air has united with them, the combination of the carbon and the oxygen has produced carbon dioxide gas; and the combination of the hydrogen and oxygen has produced water vapor in the form of a gas, which may be condensed by cooling into water. Neither of these two products will take up any more oxygen. Though water contains both hydrogen and oxygen, they are combined in such a way that to separate them again will take just as much heat as they gave off when they combined in the manner that we call combustion. By passing a current of electricity through water in the proper way we can separate the hydrogen and the oxygen; then burn them again. We will lose, however, a certain amount of energy in our mechanical and electrical apparatus; otherwise, this series of operations could be repeated indefinitely, and we would have a perpetual-motion machine—in fact, some inventors have tried to make one on this system. We may question whether it is the oxygen which supports combustion, rather than the hydrogen. A jet of oxygen gas will appear to burn in a chamber filled with hydrogen; so will a jet of chlorine gas burn in hydrogen. It requires the presence of two gases which will combine with each other to support combustion.—Editor.)

PAUL'S COVER ILLUSTRATIONS

Reproduction Originals

IN WATER COLORS

THOUSANDS of readers have praised the work of the great artist Paul—and thousands have asked us to sell them the original covers—but not until recently have we been able to satisfy this demand.

Now, reproduction originals in water colors of all the forthcoming covers of SCIENCE WONDER STORIES can be had at an astonishingly low price by our readers. *These covers are exactly the same size as the artist's painting* (18" x 25") and made with the same 13 full colors that were used in making the original. There is no printed matter whatever on the cover as you will note by the illustration at the right. Covers are made of heavy flexible mat board that makes them well deserving of a frame—a suitable picture to be hung in any home, classroom or clubhouse.

The subjects, while both educational and scientific, may appear fantastic now but in future years will be a reality. Predictions of Jules Verne, H. G. Wells and others that have come true—actual happenings in everyday life.

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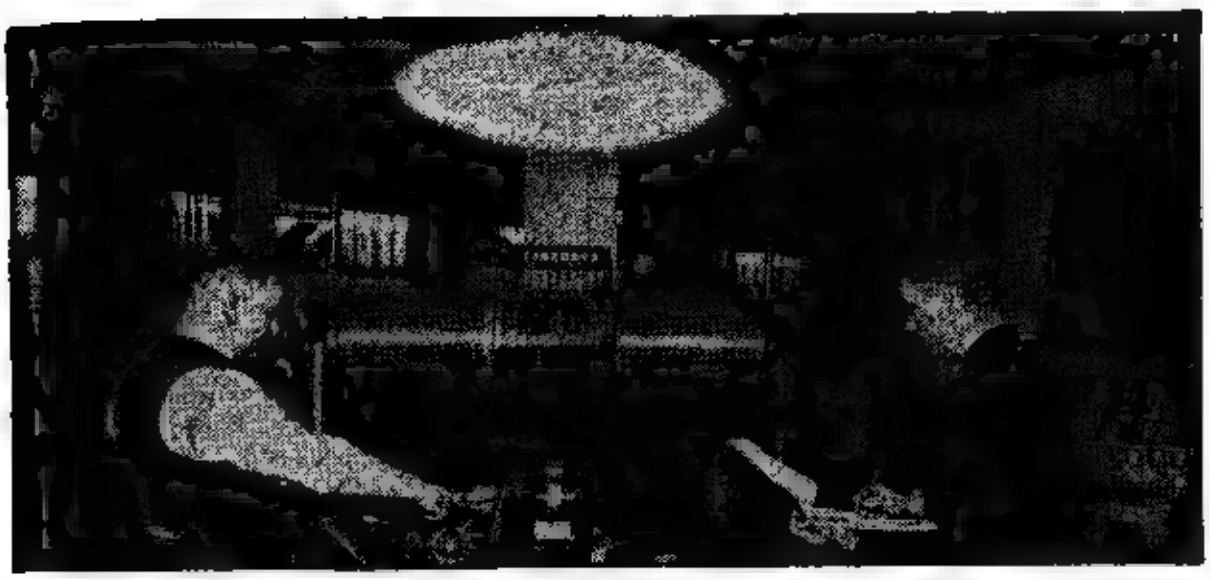

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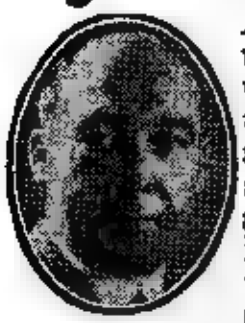

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The Reader Speaks

(Continued from page 657)

On Becoming a Meteor Observer

Editor, Science Wonder Stories:

From the first I have been an enthusiastic reader of your wonderful magazine, I might say "our magazine," like a great many other addicts do!

Being a member of the American Meteor Society, my astronomical interest naturally centers around those minor, though nevertheless important, members of the Solar Family.

Here is a field, comparatively little known, and capable of great explorations if one but takes the trouble to search out the hidden facts.

Here is a field in which thousands who admire the swift passage of a "shooting star" across the heavens, could be extremely useful to science, even by merely counting the numbers of those darting objects they see in a single hour's watch, on a clear night in August, October, December, or April, when the greatest numbers are seen.

Here is a field in which everyone, rich and poor alike may join, for the cost of equipment is negligible. All that is needed consists of one or two pencils, a long, straight rod, a few star-maps on a good projection, and a flashlight or lantern.

With the approach of another "great shower" in 1932, 1933, or 1934, on November 14 and 15, after midnight, interest in meteors and astronomy should progress by leaps and bounds.

Need I say that there are too few meteor observers especially here in the middle-west and northwest? About two-thirds of them are concentrated east of the Alleghanies, although there are some excellent observers in Texas.

Anyone interested in this important phase of astronomy should get in touch with Dr. Charles P. Olivier of the Flower Observatory, Upper Darby, Pennsylvania.

Bert C. Darling,
1809 Osborn Rd.,
Lansing, Mich.

(We call the attention of our readers to this very interesting form of recreation. It would be worth their time to investigate it.—*Editor.*)

IF you have not as yet seen the SCIENCE WONDER QUARTERLY,

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by Clare Winger Harris
"The Hidden World"
by Edmond Hamilton
"The Gravitational Deflector"
by Harry D. Parker

Do not miss the initial issue now on all newsstands!

Convincing Logic on Covers

Editor, Science Wonder Stories:

This letter has been waiting to be written for over two years. It is so long since I first started to read your wonderful magazines.

There has been an awful lot of comment on the paper used, and the cover designs of SCIENCE WONDER STORIES. What difference would it make in the stories if they were written on wood? It wouldn't make them worse and they couldn't be made any better. And the covers! The talk about their being too "commonplace," reminds me of some people and their homes. It is good enough for them, yet they are ashamed to let their "friends" see them associated with it. I fail to see anything wrong with either.

Why don't you republish "The Moon Pool?" It is the best story I have read in your magazines so far. But all the stories are very good; that is, except the fourth dimension stories. I certainly do not like them; to me they are "just a lot of words."

But, on the whole, the magazine is a very enlightening and instructive publication.

(Mrs.) Muriel Nash,
Toronto, Ont., Canada.

(Mrs. Nash's logic is truly convincing. We are, after all, hard-minded and we refuse to allow ourselves to be different from those that surround us. We are afraid that our neighbors will criticize our doing something that they dare not do—no matter how much they would like to do it. That is why many people do not read science fiction. They would like to! they feel the need of it—but they are afraid. But fortunately, from the letters we receive, we know we are making many converts, that the intelligent man or woman who time after time passes the newsstand, and eyes our magazines longingly, will eventually read them.—*Editor.*)

Some Worthy of Mention

Editor, Science Wonder Stories:

Allow me to congratulate you on your magazines. Of course, you have poor stories. All magazines do. But it is certainly well worth the labor of sorting through all the ordinary ones to find the really outstanding works—and there have been several already.

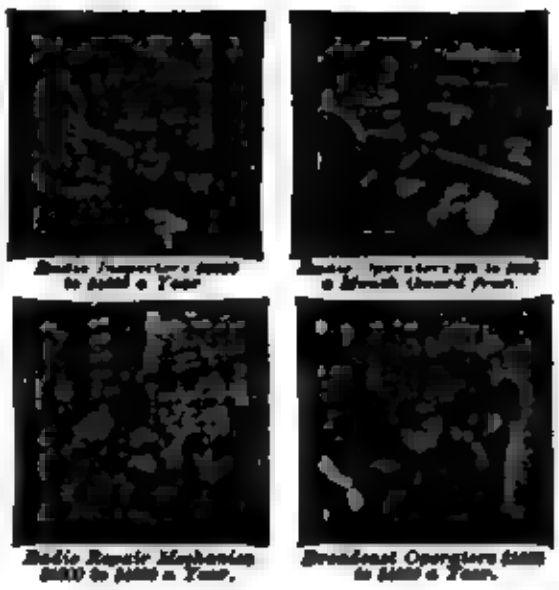
In the very first issue of SCIENCE WONDER STORIES we find "The Reign of the Ray," certainly a classic, not only from the scientific standpoint, but from the literary, political and sociological standpoints as well. It is a masterpiece, well planned and well written. Then, of course, there is "The Ark of the Covenant" in AIR WONDER STORIES. It is remarkable. Nothing more can be said of it. And there is "The Cubic City," a really humorous story, and perhaps the best of the short stories so far. Perhaps now it can more easily be seen that there is a great chasm between real humorous writing and the sloppy slapstick (or perhaps "slopstick" would be a better word) which has appeared in the past.

Doctor Keller has been steadily falling in my regard as a writer since he began near the top with "The Revolt of the Pedestrians." Then came the first installment of "The Human Termites." He suddenly rose again. If the third part is as good as the first, it will surely rank with the six best of all time, or perhaps the ten best would be a better estimate. Somehow his second part failed to appeal to me.

Jack Williamson is not another A. Merritt. (There never will be another A. Merritt.) True, he can conceive of things as startling, fantastic and foolish as A. Merritt; but in his stories they are still startling, fantastic, and foolish, while Mr. Merritt is able in some occult manner to clothe them in words and style which cause them to assume truly heroic aspect, seem perfectly reasonable, yet not ceasing to be startling and fantastic. Somehow Mr. Williamson cannot erase that last touch of ludicrousness (that word looks foolish, doesn't it?) which makes the reader inclined to laugh where he should be impressed. However, he is at worst a very good substitute, and does some nice work. But "The Alien Intelligence," while undeniably good, cannot be compared to "The Moon Pool."

"The Radium Pool" was really startling, but in the wrong manner. Ed Earl Repp assigns startling properties to this startling pool of very startling radium in this startling story. It is indeed startling that the pool appears in a work of science fiction, instead of in a fairy tale. Let's see. A pool of radium salts: according to my authorities, radium compounds, whatever the amount, are only three or four degrees warmer than the surrounding objects. Larger masses give more heat, it is true, but this heat is distributed through the larger mass, giving the same resultant height of temperature above that of the surroundings regardless of the mass. Thus the intense heat of the pool is impossible. But, assuming that the pool does have a temperature higher than the melting point of steel, 1375° C., as is stated in the story, perhaps maintained by some volcanic action, assuming this, it must be admitted that no water could be present. It all being vaporized at 100° C. Then we have a pool

(Continued on page 663)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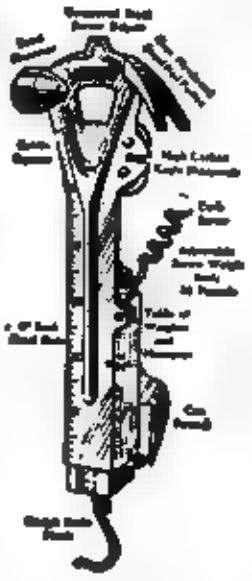

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The Reader Speaks

(Continued from page 661)

of molten radium salts, with a temperature probably greater than the melting point of radium chloride, which is 1650° C. Imagine a hand being dipped into a liquid 300° hotter than molten steel. Then try to imagine the owner of the hand growing younger as a result of the immersion! Comical! Fairy tale! Exposure to radium rays, far from restoring youth, I am told, produces burns, painful ones, and destroys tissue alarmingly. And a burn by molten steel can be imagined. Still the combination of the two produces no ill effects other than a painless amputation and a restoring of lost youth! O Death . . . . ! I am certain that I would not care to approach one of these radium pools, consisting of great amounts of radium salts at high temperatures without a vacuum-walled suit lined with a great abundance of lead and asbestos, I feel fairly sure I can say the same for Mr. Repp. The story was not worthy of the author of "The Metal World," which was much, much better. And I should not forget "Beyond Gravity," another excellent one.

And an important question: Is Frank Phillips, author of "The Onslaught from Venus," the same person as Philip Francis Nowlan, author of "Armageddon?" Did the author assume a pseudonym, or did the editors make a mistake, for once? The story itself was fine, whoever the author. So different from usual invasion stories, it presents the Terrenes well equipped and able to cope with the outsiders; instead of having them sit uselessly by waiting for a kind providence and a kind author to save them.

"The Ancient Brain" was worthy of mention as an interesting story

Ditto for "Warriors of Space." I favor J. P. Marshall against the readers. I favor the readers against Kennie McDowd. He will do better next time; it would be hard to do worse —hard on the readers, too.

"The Silent Destroyer" was worthy of mention. "The Yellow Air Peril" was worthy of mention. "The Planet's Air Master" was worthy of mention."

I favor reprints from the *Argosy* and others; especially "The Girl in the Golden Atom" by Ray Cummings.

And all of the above probably doesn't mean a thing . . . .

Robert D. Swisher,
918 South State St.,
Ann Arbor, Mich.

(This is really one of the best letters of criticism of our stories that we have received. It is short, to the point, and yet contains some well-thought out ideas. We are indebted to Mr. Swisher.

He has given us so much to mull over that it is quite impossible to make adequate comments. One thing we can say is that it is impossible to predict the effect of a large body of radium salts. Our experience has been with only the minutest quantities. Certainly it takes a stretch of the imagination to picture a person being rejuvenated by them; but Mr. Swisher will not call that impossible. We would be very glad to get his comments after finishing "The Human Termites." Frank Phillips, the author of "The Onslaught From Venus," is the same man as Philip Francis Nowlan, author of "Armageddon."—*Editor.*)

Idea of Central Human Intelligence

Absurd

Editor, Science Wonder Stories:

Targets for brickbats seem to steadily dwindle in number with the advent of every new issue of SCIENCE WONDER STORIES. Indeed, those that one does succeed in finding now will always admit arguments for both sides of the question; and at that, not always in favor of the finder.

Still, it seems to me that an attempt to find the flaws in a scientific story serves at least as a refreshment to our knowledge of the sciences. Therefore, I shall make the attempt.

The "Onslaught from Venus" by Frank Phillips cannot be too highly praised. It is a story that shows preparation and thinking, and is devoid of scientific flaws so far as the knowledge of this century extends.

In his "Human Termites," Dr. David Kel-

(*Continued on page 664*)

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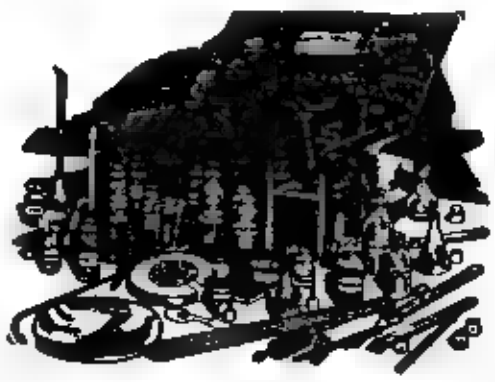

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The Reader Speaks

(Continued from page 663)

ter seems to have lost the scientific thought of his tale and gone roaming into the absurd.

The idea of a central intelligence ruling the termites is not so bad, but when it comes to applying it to *Genus Homus Sapiens* it sounds utterly ridiculous. There is nothing to uphold such a theory and much to disprove it. It admits telepathy and the control of one hundred million subconscious minds by a single individual. The evolution of man from the ape fails to explain where this controlling intelligence originates. Furthermore, Dr. David Keller has made a mistake in his own profession. When he spoke of placing fifty ovaries or so within a woman's body, he forgot that a certain section of the subconscious mind controls these organs. It is fitted to control two and no more. It would be possible to add more, but they could not function. There would be nothing from the brain to control them.

Why not publish some stories which have chemistry or mathematics for a theme? It would be a relief from contemporary physics and biology.

James E. Sinter,
751 Bergen St.,
Jersey City, N. J.

(We beg Mr. Sinter to accept Dr. Keller's idea of the Central Human Intelligence in the way it was meant. Dr. Keller was merely using the individual in the cave as a figurative or symbolic representation of his idea. What he meant was that there is a fictional consciousness of each well-defined group of people, such as a nation, and that consciousness exerts a great influence on its members. Thus America has its own ideals, its morality, its political beliefs, etc. In short, according to Dr. Keller, a nation is an organism just as a body is. And the people are members of that organism and are expected to act so as to make the organism stronger, an "All for One" conception. Therefore, as Wells once pointed out, when any foreign body gets into an organism, that tends to produce a weakening of it (such as a germ in our bodies) the organism tends to try to expel the foreign body. That may be by imprisoning or killing it. Our bodies set up anti-toxins. So we must look at the theme rather broadly. Dr Keller does not seriously believe that such a man or any being exists in a cave in the Rocky Mountains. We hope this clears up this question. Seemingly, as if in response to Mr. Sinter's request for a story on a mathematical theme, we are planning for the near future a marvelous work of Dr. Miles J. Breuer on the Einstein theory. It is not only ingeniously worked out, but Dr Breuer has made the explanations so simple that everyone will find enjoyment in the story.—*Editor.*)

(Continued on page 665)

IF you are a lover of science fiction, you must certainly obtain the November issue of AIR WONDER STORIES, now on all newsstands. This magazine specializes in science fiction in which aviation of the future is featured. You will find here your favorite authors in stories as stimulating and exciting as those in SCIENCE WONDER STORIES.

Contents of the December issue are:

"Freedom of the Air,"
by Edsel Newton.
"The Phantom of Galon,"
by J. W. Ruff.
"The Flight of the Eastern Star,"
by Ed. Earl Repp.
"Cities in the Air,"
(Final Installment)
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The Reader Speaks

(Continued from page 664)

Can't Get Magazine Away from Parents

Editor, Science Wonder Stories:

Although I have read only two installments of "The Human Termites" so far, and the third promises to be greater than the first two, the story has to me a tremendous meaning.

You can't go wrong in publishing stories by Dr. Keller. In my opinion, he is your best author.

However, let's get down to the point of this humble epistle. I read, of course, "The Science News of the Month" and the section "The Reader Speaks." In your latest number (i. e. October), there is a letter from Kenneth Johnson, of Clinton, Iowa. His first paragraph is O. K. In fact, I would say the same myself, but that he has said it. But! It is the part where he says that the magazine is enclosed in "too lurid covers, that fairly shriek the word 'trash,'" that I object to. He says that you, or rather Paul, don't choose the colors well. If I may say so, I think he's all wet.

The colors are very good, and the pictures are anything but trashy or even suggestive of trash. Nor are the pictures as impossible as he suggests. If the magazine covers had less "lurid" (as he calls them) colors, the ordinary layman would say that for a magazine with a title such as Science Wonder Stories has a very tame picture on the outside; and therefore, he wouldn't look inside. Or, he would say to himself, it is just like those other magazines which are trash.

Mr. Johnson says also that he has a hard time convincing his parents and friends that the magazine is good material. The hard time I have is in trying to convince my parents that I have a right to read the magazine which I own. I can't get it away from them. Paul is doing good work, and, with his wonderful imagination, he illustrates the stories very aptly.

In Mr. Johnson's last paragraph, he says something about the authors thinking that they have revealed scientific facts when they talk about X, Y, & Z rays, atomic disintegration, shining metal apparatus, etc. The title of the magazine, Mr Johnson, is Science Wonder *STORIES*, not "Scientific Facts Revealed," or something to the same effect.

C. G. MacDermott,
2525 York Street,
Vancouver, B. C., Canada.

(We wish we could help Mr. MacDermott in his perplexing problem, how to get his Science Wonder Stories away from his parents so that he may read it himself. If we suggested three copies of the magazine for the family we might be accused of trying to boost our circulation. And our intent is more innocent than that. We have found that in such problems a schedule of reading hours might be arranged whereby on Tuesday and Thursday evenings from 7 to 9 mother may read it; on Monday and Wednesday it is father's turn, and Friday and Saturday, our correspondent has his chance. For Sunday, the best we can suggest is to pitch a coin.—*Editor.*)

The Need of Science Fiction

Editor, Science Wonder Stories:

Here is a thought in poetic form. Perhaps it's not much. Still it's something for science fiction from me.

THE NEED OF SCIENCE FICTION

There to the west the gold sun goes down,
And in its place a darker shade arises,
Bringing night and the shadows, and the stars:
Those twinkling dots stuck to the black curtain of sky, made of a vast multitude of them.
What are we but a vain, air-sucking spot; An electron in a molecule in space; An atom to the earth that we tread on—Less than a billionth inch in this vast mass—Can I but call it so—of space, in this forever lasting universe in which our sun, our moon, our earth, our continent is but a mere nothing, and we much less.

What can we do in that great place called space? Can we stop the great sparkling, brilliant sun from hurling? From giving light to our and other globes? Can we leave this tiny earth, when it is barren, cold and lifeless too? Now is our earth with vegetation filled. And we have time to steel ourselves against that overhanging doom. And that one thing is

(Continued on page 667)

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The Reader Speaks

(*Continued from page* 665)

science fiction, with which to gratify our imagination and with that and a scientific background, to learn new facts; build better homes to live in; new machines, and be prepared for what will come to pass.

Dave Portigal,
New York, N. Y.

(We appreciate very much Mr. Portigal's thoughts contained here and we are sure that our readers will too. Science fiction does pave the way to the solution of the problems that will rush in upon us in the future. There is no doubt that our universe is undergoing many changes, some of them of a stupendous nature, from our earthly standpoint. But we have faith that with the increase in our knowledge science will be able to predict many of these cosmic disasters and, to the full extent of human ability, prepare for them.—*Editor.*)

O. Henry Ending Disappointing

Editor, Science Wonder Stories:

Commenting on and criticising the stories, when you know most of the authors, is rather hard to do; so I will start out with the only unfavorable criticism I have. Why do you not publish the complete address of the persons whose letters appear in your discussions? Of course, I realize that some people do not give their complete addresses in their letters when writing to you; but most of them do, so why not print them. I ask you this because when some one writes in and says that they are interested in a Science Club, or words to that effect, we of the Science Correspondence Club are considerably handicapped when we wish to get in touch with them. A notable example is Mr. Frank Kelly's letter that appeared in the October issue of Science Wonder Stories. I wrote him two letters and they were returned because of unsufficient address.

Now to the magazine itself: Your imposing array of scientists on your editorial staff precludes the possibility of any unworthy matter appearing in your magazines. I can truthfully say that I have never read a story in any of your publications that wasn't interesting, and I have been with you from the time of "Dr. Hackensaw's Secrets."

A few of the outstanding stories are, in my estimation: "The Moon Pool"; "The Second Swarm"; "The Second Deluge"; "Shylock of Space"; "Ark of the Covenant" (an old *Science and Invention* story); "The Alien Intelligence"; "The Shot Into Infinity" (very good material for a sequel here); "The Radium Pool"; "Warriors of Space"; "The Yellow Air Peril"; "Ralph 124C41+"; "Into the Green Prism"; "The Land that Time Forgot" (reprint); "Around the Universe"; and that mighty story "The Human Termites". In analyzing the thought of this great story by Dr. Keller, it will be seen that it is awe-inspiring and offers food for much meditation. The only grain of disappointment is the O. Henry ending. You will receive many criticisms on this great story, by far the best story based on fact ever printed in your publications.

Because I receive criticisms, praise, and suggestions upon your magazines and their contents, from my numerous correspondents, I am able to speak with a little authority on the subject when I say that science fiction is taking a great place in literature and it will be as enduring as literature itself. In closing, I wish to say that all interested in the Science Correspondence Club, please write me. As I now have to answer an interesting letter received from Mr. Ed Earl Repp, I will close.

Walter Dennis,
4653 Addison St.,
Chicago, Illinois.

(As Mr. Dennis will observe, wherever a full address is given in a letter, it will be printed.

We are sorry that he is disappointed in the ending of the "Human Termites". In the opinion of most of our readers it was masterly. The idea was simple [perhaps that is the fault many find] but it was so ingenious, and showed so cleverly the ability of man to extricate himself finally from disaster, that literally thousands of readers tell us that they were thrilled.—*Editor.*)

(*Continued on page* 668)

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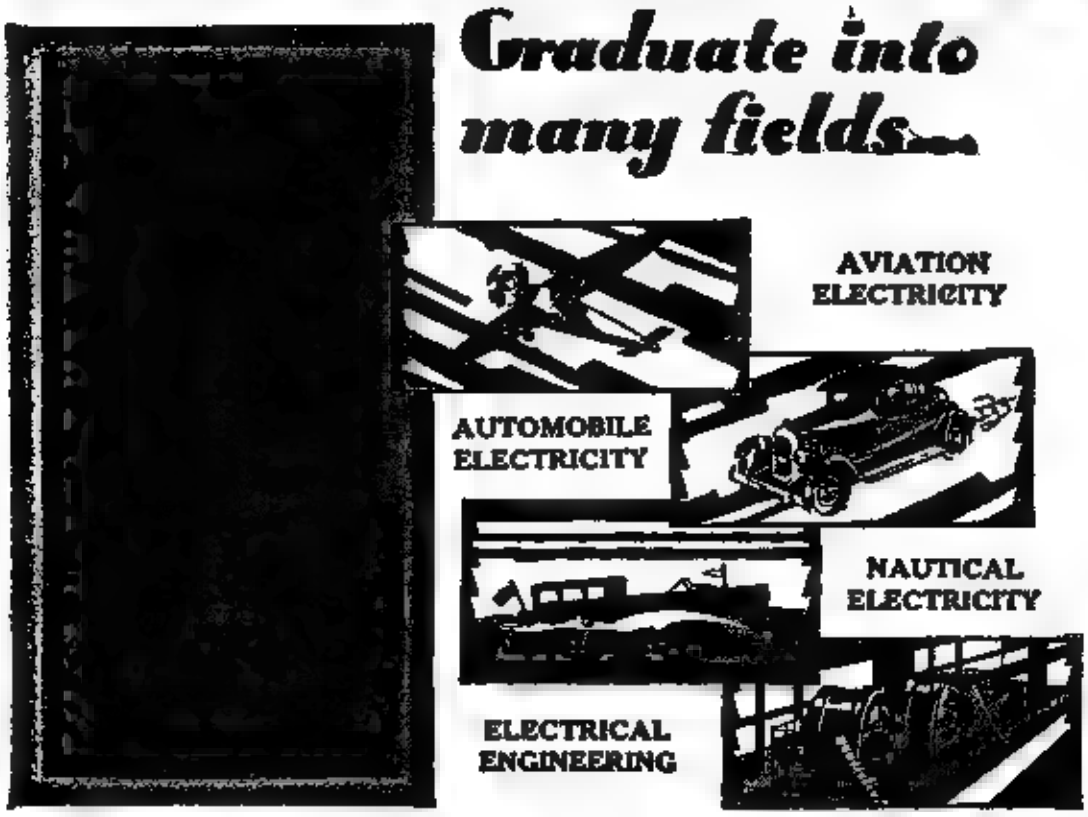

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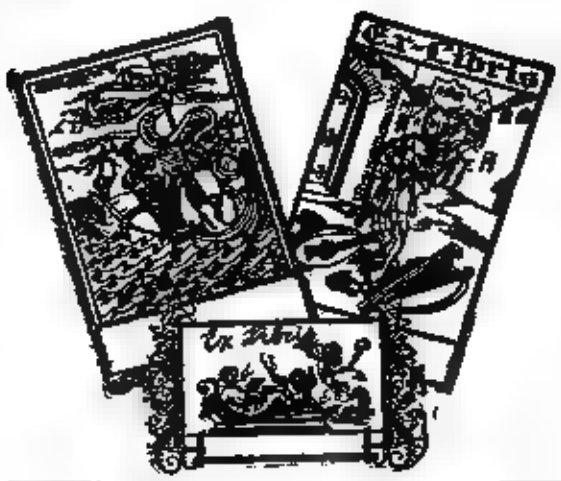

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The Reader Speaks

(Continued from page 667)

An Open Letter from Ed Earl Repp

Editor, Science Wonder Stories

May I edge in for a few inches of space to express my keen appreciation for the kindly criticisms the readers of SCIENCE WONDER STORIES and AIR WONDER STORIES have submitted on my stories "The Radium Pool" and "Beyond Gravity"?

For several months I have felt an urge to write something—an open letter to the readers, to let them know that we writers appreciate their letters of criticism beyond the description of mere words. They help us to do better work, write more intelligent stories, and in general have a great effect upon the morale of the scribes who strive hard to give them something worthy of their consideration. In fact, we of the *literati* look upon these letters and criticisms much in the same manner that a performer looks upon reviews published in the newspapers after their public appearances. They are equally effective. The performer always works hard for a good review. The scribe, to my knowledge, is no different. He, too, works hard to please, to amuse, and gain some kind of recognition from the readers of his stories.

Moreover, I wish to take this opportunity to inform those readers who have asked for a sequel to "The Radium Pool," that such a story is now taking definite shape in my mind and it will not be long before something is done to retaliate against the frog-faced Jovians for robbing the earth of its radium, and subsequently escaping with Allie Lane, her father, and loyal old Driftin' Sands. Meanwhile I hope that my stories that appear in the meantime will serve until "The Radium Pool" sequel is offered.

At this time I also want to thank the readers who have sent letters direct to me instead of submitting them to the editors. It would be quite impossible for me to answer all of them individually at this time; though I hope to do that very thing one of these sunny California days. I have derived great pleasure from reading all the letters and I am grateful for both praise and brick-bats. The latter are especially helpful, because they make me want to be more careful with my science and literature as well.

Needless for me to say that SCIENCE WONDER STORIES and AIR WONDER STORIES in my opinion, are two of the finest, brain-broadening magazines offered the public today. Their readers, beyond doubt, are the most intelligent, and most progressive people in the world. As a result they have a keener insight into the vast future than those who take great delight in reading harum-scarum hokum in six-gun or sex pulpmags. They are burning through diligent investigations the cobwebs of man in the universe, and the great part he actually plays in the dreams of life.

Ed Earl Repp,
Los Angeles, Calif.

(We are very glad to get this letter from Mr. Repp. We can see that our discussion columns are serving a three-fold purpose in promoting the interest and stimulating the activities of writer, editor and reader.—*Editor.*)

Miles In a Light Year Corrected

Editor, Science Wonder Stories:

In the September issue of your magazine a young man by the name of Earl Valet, residing at Brooklyn, N. Y., said he figured that there were 31,472,042,813 seconds in a year of 365 days, 6 hours, 9 minutes, 4.6 seconds.

I would like to criticize him from an arithmetical standpoint as I also have figured it out, only I received a different and more logical answer, which is 31,472,041.1 seconds.

Further, Mr. Valet also figured how many miles were in a light year by multiplying the speed of light (which is 186,284.2405 miles per second and not Mr. Valet's 186,284) by the number of seconds in one year.

I will admit I did not check his calculations on that because his speed of light most likely was taken from the 1929 World's Almanac. It was given to me in centimeters per second, which equals 299,796x10 to the 10th Power and reduced to miles per second the aforesaid answer resulted.

But the answer I found me to miles in 1 light year at the correct speed of light equals 5,862,745,273,927.725373 miles.

I hope you will publish this letter because of the fact I am not only helping Mr. Valet but am also helping many others.

John S. Blake,
Midland Park, N. J.

(In fairness to themselves the editors wish to state that they were already aware of the error in Mr. Valet's calculations, but allowed the error to pass. We wished to see just how alert our readers were and if one would catch it. We are glad to note that Mr. Blake did.—*Editor.*)

The Mood of An Evening

Editor, Science Wonder Stories:

The eerie noises of the screeching night, of the howling wind, of the snowless blight; they register not in my errant mind. The hoot of the owl, the neigh of the mare, I see naught but what's up there, that hurtling demon. . . MIRI!

I look appalling with my tired eyes. I see it blink through my window now, hurtling yet through the mired skies, God! . . . . that demon. What it shall be I have not as yet pondered upon my brow to wet; and so help me God! for as I look again, I behold a sight He made for man. I behold before me Mars but as in the past, A demon!

"True it is."

We see much through our artificial eyes, we figure much with our developed brain, but as I have pontially insinuated . . . . we know nothing!

"But our day shall come!"

Seventeen hours of work! Because of a misstep in the office books. I am in one of those rare moods, a mood that even I, though rarely afflicted with it, enjoy it, for it does one thing . . . . it permits my imagination to wander where it wishes. Although it is short, it takes away my want for companionship and never visits me for over two hours. And yet I mean no harm.

About my magazine.

Mr. Editor, I admire you! But as yet I have not seen your picture in any of your numerous magazines that you have published. How about my friend Paul? Your splendid idea of giving us a look at the authors is greatly appreciated. But how about yourself? I am sure that every other reader will vigorously insist upon my view.

Pardon the insinuation, but the only thing that I know about your personal looks is that you have a mustache . . . and I'm not sure of that either.

The stories are superb. Yet of all of the stories that you have published in both AIR WONDER STORIES and SCIENCE WONDER STORIES, I liked the one named "The Moon Virgin," by Leanis MacDavid. It gives me a perfect picture of its author.

How it is, I do not know, but I read that story three times, a thing that I hadn't done to any story other than Mr. Burroughs' Six Martian stories. The other stories were very fine also, other than "The Reign of the Ray."

Probably it is my imagination, and some other fan may like the story as well as I like Lemnie's story, as I hope that Messrs. Pratt and Lester do not entertain any hard feelings in the event that they read this letter. The truth is, though, that I dislike their story as much as I liked the other. It seemed to me that it was wholly composed of a complicated mass of jumbled dates and figures which . . . well . . . it seems as if I am actually complaining of the magazine.

I would like to ask a few questions that probably many of your readers would wish to ask.

May we write to the authors?

May we establish a correspondence with each other individually?

May some one reading this letter write to me?

God knows I wish they would.

Oh you long dead moon. As you fall with the range of my window sill, must you hide as soon instead my dreams to fill. I have but fifteen minutes more, to watch your fascinating face to-night, but you know that still I'll

(Continued on page 669)

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SONG POEM WRITERS—"Real" proposition. Hibbeler, D189X, 2104 N. Keystone, Chicago.

The Reader Speaks

(*Continued from page 668*)

watch galore, even in your poor dead plight?

Yet here she comes a-rarin'. I watch again to-night, but yet she keeps a reddening, through the hurtling skies all night. I stretch my eyes up toward her. On my tip toes do I stand, I raise my hand up to her, and upon me she stamps her brand.

The moan of the wind, the black clouds cover her fast, the dying blink of her one red ring and in a moment she has passed. But I'll see her again, for she was made for all men, and to-morrow at last, just as in the past, I shall see her hurtling through the skies like a demon . . . Mars.

Good night.

I shall answer every letter written to me . . . and I can write a good one. A letter from the wilds of Africa or the hotness of Tibet and even to the freezing north would put me into another mood some night.

In fact, one letter from any place at any time would suit me.

Ulysses George, Jr.,
San Francisco, Cal.

(We enjoyed this rare letter very much. We are sure that many of our readers will feel with Mr. George and will wish to correspond with him. The editor can feel with the writer in the subtle intoxication of the night heavens. They provide one of the most fascinating sights given to mortal man. We invite Mr. George to write us when the "feeling" next strikes him.—*Editor.*)

From a Brazilian Friend

Editor, Science Wonder Stories:

I have instructed Messrs. Edanee, of this city, to subscribe on my behalf to your magazine. I should be pleased to know if you are also carrying on a *Quarterly*.

As you have so often asked for suggestions, I would offer the following:

(a) Refrain, as much as possible, from reprinting stories by popular authors, who are already widely known.

(b) Avoid the more glaring improbabilities.

(c) Read the stories yourself, and cut out such parts as would tend to give your readers false knowledge of scientific facts.

(d) Remember that love interest can only enter these stories if it is dragged in by the hair.

P. S. Good luck, old chap!

C. R. Paratico,
Rua Paraguassu, 39 Brazil.

(It is quite nice to receive good wishes from a well-wisher in far-off Brazil. Mr. Paratico's suggestions are gratefully received, and as such will receive consideration. We invite his criticism of the magazine.

For his information the quarterly was published September 15—Editor.)

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Of SCIENCE WONDER STORIES, published monthly at 404 Wesley Avenue, Mt. Morris, Ill., for October 1st, 1929.

State of New York
County of New York
ss.

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared Irving S. Manheimer, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the SCIENCE WONDER STORIES, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Stellar Publishing Corporation, 404 North Wesley Ave., Mt. Morris, Ill.

Editor: Hugo Gernsback, 98 Park Place, New York City.

Managing Editor: David Lasser, 98 Park Place, New York City.

Business Manager: Irving S. Manheimer, 98 Park Place, New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Stellar Publishing Corporation, 404 North Wesley Ave., Mt. Morris, Ill.

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D. Manheimer, 98 Park Place, New York City.

3. That the known stockholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustee, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

IRVING S. MANHEIMER.

Sworn to and subscribed before me this 1st day of October, 1929.

JOHN S. CONSIDINE.

(My commission expires March 30, 1930.)

BOOK REVIEWS

THE SOCIAL WORLD OF THE ANTS, by Auguste Forel, translated by C. K. Ogden. Two volumes, 1000 pages, illustrated; stiff cloth covers; size 5½ x 9. Published by Charles and Albert Boni, New York. Price $15.00.

Unless one is a peer among entomologists, he must approach with trepidation the review of such a monumental book as *The Social World of the Ants*. It is difficult with proper balance of modesty to pass judgment on the work that represents the lifetime, and a goodly lifetime at that, of a scientist of the first rank.

We may be disappointed or chagrined, on going through Forel, to find that he explodes many of our notions about the intelligence or lack of intelligence of the ant. He is not concerned about our emotional feelings or prejudices for or against the ant. He cold-bloodedly attacks that much-discussed question on a mathematical basis and concludes that 95% of the ant's actions are determined by hereditary instinct; 4% represent "emotional constellations," and acquired habits; and a bare one percent may be interpreted as the ant's individual adaptability to circumstances—what we term "intelligence." We then may safely put ourselves into a class apart, when we learn that reflection forms the basis of 60% of the actions of an adult human being.

But, if Forel will not concede the little fellows mental kinship with human beings, he is yet only too aware of their remarkable survival in life, despite the adversity of their heritage. Blind, beset by enemies on every side, cursed with appetites, the satisfaction of which means the introduction of parasites into their homes, the ants have in every part of the world maintained their existence against all odds. This Forel brings out very eloquently.

The book will no doubt remain as a bible for the formicologist for some time. It might be truthfully called the authentic history of the ant; for it covers in detail, not only the evolution of the species so far as fossil records indicate, but is a masterly classification of the ant world which, we understand, comprises 3500 species and 4000 races and varieties. From the egg to the larva, the chrysalis and the adult ant, Forel traces its growth indicating the forces operating on the growing embryo and the life it finds when it finally emerges into the world. Not satisfied with being the anthropologist and historian and painting the external life of the ant, Forel becomes the physicist and gives us a medical treatise on the physiology and psychology of the family *Aymenoptera*. Its internal organs are laid bare, so that it becomes a living organism as well as a social creature quite at home in the world.

To the entomologist or serious student, this work needs no introduction. To the amateur it affords a textbook that need not be supplanted for a long time; while to the general lover of nature, or even the book collector, will devote to its numberless illustrations and beautifully-colored plates, alone, many hours of absorbing perusal.

THE THINKING MACHINE, by C. Judson Herrick; 366 pages; stiff cloth covers; size 5 x 7¾. Published by University of Chicago Press, Chicago, Ill. Price $3.00.

From the beginning of philosophy there has raged the battle between the mechanists and the vitalists over the nature of man. The former have asserted that man is a mechanism and that the expression of his so-called mind and spirit is merely a manifestation of chemical activity going on within him. The vitalists give to man's spirit a definite meaning "as a thing apart", an endowment of a vital force with him alone that sets him apart from the other forms of life. Dr. Herrick is a broad-visioned mechanist. While conceiving man as a machine, he gives to man the power of being able at will to change himself; asserting that he is not simply a clockwork, as the narrower mechanists assert. Dr. Herrick's theme, therefore, is that man by studying himself as a mechanism can best learn the laws of his nature, especially of his mind, and thereby be enabled to improve his mind and his use of it. The present book is a comprehensive study of man—the mechanism; a study of the biology, the physiology and the psychology of his being. Many will disagree with his conclusions; but they are sure to be interested by the light he sheds on our essential nature.

MODERN SCIENTIFIC KNOWLEDGE, by Frederick A. Cleveland, Ph.D., LL.D.; 590 pages, illustrated; stiff cloth covers; size 5½ x 8½. Published by Ronald Press, New York. Price $4.50.

The purpose of this book is best described by the author or rather editor himself when he says in the introduction: "What is undertaken is the presentation of a vision of the world we live in as seen by men of science." What Dr. Cleveland has done is to gather about him fourteen eminent scientists, each an expert in his field, and to put together in this book their views on the nature of the evolution and present status of our material universe. The subject is divided into four general parts: the sociological, which treats of the need for a broad and sane perspective of the universe about us; the nature of the inanimate universe, that of the astronomer and geologist; the animate universe, that of the biologist; and, finally, the universe of man. Man is treated as an organic, individual being and, also, as a social animal in order that his place in the world may be more thoroughly scrutinized. For those interested in getting a broad perspective of our knowledge of ourselves and our world, this book is warmly recommended.

HEREDITY AND PARENTHOOD, by Samuel S. Schmucker, Ph.D., Sc.D., 320 pages, illustrated; cloth covers; size 5½ x 8. Published by Macmillan Company, New York. Price $2.50.

Dr. Schmucker has attacked the problem of determining from whence come our characteristics, our tendencies in life that make for our success or failure, happiness or unhappiness. He asks, "Why are we what we are?" Why has one person blue eyes, another brown; why is one tall and handsome, another short and ugly? To answer this question he searches into the experiments of Weismann, Mendel, Haeckel and the other great biologists and finds the answer in inherited characteristics. Within the germ-cell there is a tendency for us to be what we are; and when the time favorable to the development of the tendency comes, the blue-eyed child will be born of brown-eyed parents and the stupid parents will give birth to a genius. We may inherit disease, or health; we may inherit traits toward criminality. How the knowledge of how we have come to be what we are can be applied to the problems of life, Dr. Schmucker takes up in the second half of his book and draws from it wise and sane conclusions. He applies the wealth of our knowledge about ourselves to the complex social and emotional relationships in order that we may live more in harmony with our innate tendencies. It is a book worth reading.

BELIEVE IT OR NOT, by Robert L. Ripley; 172 pages, illustrated; stiff cloth cover; size 5½ x 8¼. Published by Simon and Schuster, New York. Price $2.00.

Mr. Ripley has collected here some of the rather astounding facts of our universe that he previously printed in his columns in the *New York Evening Post*. We are informed that he travelled about the world gathering strange and even, to our casual thought, impossible facts. Yet in each case Mr. Ripley presents the proof of his assertion, or if proof is not possible to print he declares himself willing to send the proof on request. The book has an interest for those scientifically inclined because there are many facts of our scientific world included in his amazing collection. One is the statement that if all the Chinese in the world were to march four abreast past a given point they would keep marching forever and all would never pass the point. His explanation is adequate. Enough new marchers would be born in the interim to keep the parade well supplied with material. The book will furnish many evenings' interesting reading.

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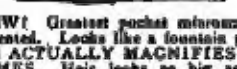

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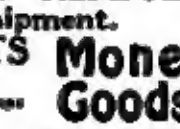

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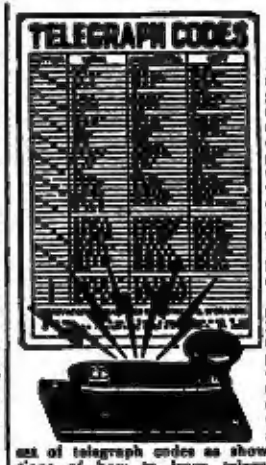

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Positively the most astounding scientific instrument ever developed. This instrument formerly sold from $1.00 to $50.00 upwards. Now it is possible to get it for a small sum. Witness actual destruction of thousands of Worlds by simply looking through the lens of the instrument. Actual radium is distinguished before your eyes. You see the atomic bombardment plainly. Instrument is guaranteed to contain a minute quantity of radium. There is no more enthralling sight in the whole world. Nothing to wear out. Lasts forever.

No. 8526—Spinthariscope complete with instructions. Prepaid **65c**

Invisible Ink

A fluid in which you can write love letters, confidential messages, etc., without fear of detection. Remains entirely invisible until paper is heated. Used extensively by secret service operatives, detectives, etc.

No. 8528. Invisible Ink. — Per bottle, prepaid **15c**

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Combination Cigar, Cigarette, Pipe Holder

A combination pipe, cigar holder and novelty view. A bottle shaped novelty that has a scenic view in the top, may be converted into a pipe, a cigar holder or a cigarette holder. Made of highly polished wood with aluminum fitting. Stands 6" tall when closed. A useful article and a real novelty. Assorted views. French actresses and scenic pictures.

No. 8599. Combination Cigar Holder. Prepaid **75c**

Cigarettebags

Here boys is THE novelty. Box contains a dozen tiny wood pegs—but they are "treated." Push the sharp end of peg into cigarettes about 1/3 in. Pegs are so small they're invisible. Then offer your friends the cigarettes. BANG, BANG! they go off—Yet ENTIRELY HARMLESS.

No. 8522. Cigarettebags **15c**

Prepaid

Midget Harmonica

The smallest harmonica made, only 1¾" long. It is a practical musical instrument and a popular novelty. Has four single holes, eight perfectly tuned reeds, brass plates, nickel finish covers and ring to attach to your watch chain or fob.

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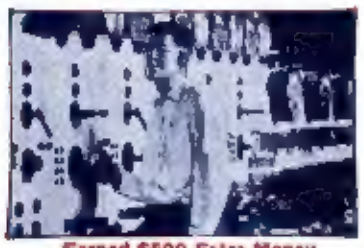

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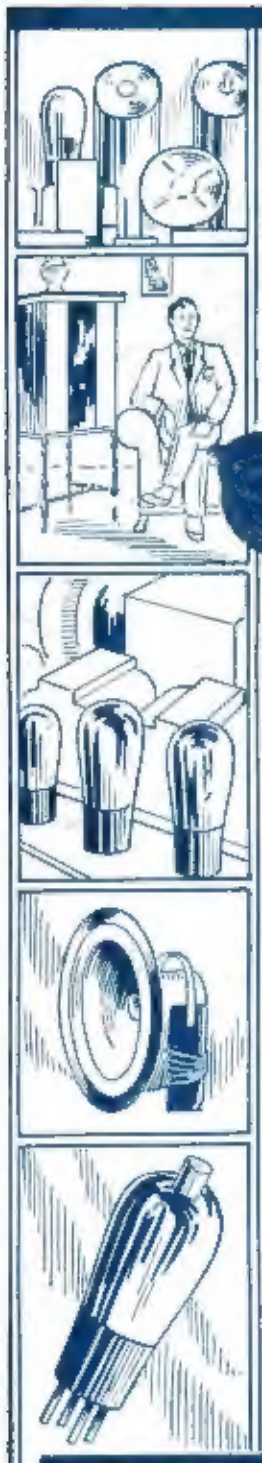

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